U.S. ARMY-BAYLOR UNIVERSITY

GRADUATE PROGRAM IN HEALTH CARE ADMINISTRATION

AN ASSESSMENT OF THE EFFICACY OF A NEW ADMISSIONS PROCESS AT MADIGAN ARMY MEDICAL CENTER

A GRADUATE MANAGEMENT PROJECT

SUBMITTED TO

THE FACULTY OF BAYLOR UNIVERSITY

BY

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During this period of escalating medical costs and constrained resources, new and innovative methods of conducting business must be adopted. In response to this changing environment, Madigan Army Medical Center has focused attention to efficient and effective utilization management programs. One change in process that is the result of this focus was the institutional change in the admissions procedure for non-emergent surgeries. This change in admissions policy is exemplified by the establishment of a Pre-Admission Unit (PAU) in which all pre-admission testing, education, pre-certification, and discharge planning occur in one centralized location. Like many other changes in procedures, there had been no prior evaluation of the effectiveness and efficacy of the new unit. A retrospective analysis of 518 patients who had been admitted for one of six surgical DRGs was conducted to determine if there had been any change in the average length of stay for those patients being admitted in accordance with the new procedure. Findings indicate that the establishment of a PAU has resulted in an average savings of 2.08 occupied bed days (OBDs) per procedure. The potential fiscal savings and conservation of resources resulting from this decrease in lengths of stay are enormous.

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ABSTRACT

During this period of escalating medical costs and constrained resources, new and innovative methods of conducting business must be adopted. In response to this changing environment Madigan Army Medical Center has focused attention to efficient and effective utilization management programs. One change in process that is the result of this focus was the institutional change in the admissions procedure for non-emergent surgeries. This change in admissions policy is exemplified by the establishment of a Pre-Admission Unit (PAU) in which all pre-admission testing, education, pre-certification, and discharge planning occur in one centralized location. Like many other changes in procedures, there had been no prior evaluation of the effectiveness and efficacy of the new unit. A retrospective analysis of 518 patients who had been admitted for one of six surgical DRGs was conducted to determine if there had been any change in the average length of stay for those patients being admitted in accordance with the new procedure. Findings indicate that the establishment of a PAU has resulted in an average savings of 2.08 occupied bed days (OBDs) per procedure. The potential fiscal savings and conservation of resources resulting from this decrease in lengths of stay are enormous.

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INTRODUCTION

A. Conditions Which Prompted the Study

Madigan Army Medical Center (MAMC), located at Fort Lewis, Washington is a teaching facility and tertiary-care medical center. It has regional responsibility for seven states in the Pacific Northwest. The states included in this region are: Washington, Oregon, Idaho, Montana, Alaska, Northern California, and Nevada. The final decision on whether Northern California, Nevada and Alaska will remain in the Pacific Northwest Health Service Support Area (HSSA) or region is still under debate. Alaska may eventually fall under Tripler Army Medical Center's regional command. Nevada and all of California may eventually move under William Beaumont Army Medical Center's region, but currently, all seven states report and refer patients to MAMC as their regional command.

Madigan is a 1.2 million square foot, 414-bed, 280 million dollar complex. It is currently the newest and most modern Department of Defense medical center. Construction started in 1985 and the new Madigan Army Medical Center opened on 28 February 1992. The new Madigan replaced the old Madigan Medical Center, which was constructed in 1944 and consisted of a one story, multi-corridored medical facility that covered 120 acres.

Designed and constructed for beauty as well as form and function, Madigan operates with state-of-the-art technology in both clinical and administrative support areas. Technologically advanced clinical systems include the Medical Digital Imaging System (MDIS), a networked Clinical Information System (CIS), and Magnetic Resonance Imagery (MRI). Leading edge architectural designs include interstitial spaces between each floor, computerized cart delivery supply systems, pneumatic tube and rail cart messenger systems, and a drive-through pharmacy.

In addition to the eight inpatient floors, there is a three story ancillary building and medical mall with an automatic skylight system and escalators and a detached MRI complex. The Central Medical Supply (CMS) has a dedicated, sterile elevator shaft that allows sterile supply carts to be delivered directly into two floors of operating room sterile cores as well as normal elevator shafts that the robotic cart delivery system can access for routine deliveries of supplies or pickup of laundry, trash, etc.

A stream and water collecting pond flows between the medical mall and the rest of the center. This pond serves two purposes. It is both a picturesque attraction for patients and a heat-exchange cooling system for facility ventilation. Unofficially, it is also a fantastic resort for assorted Canadian Geese and other waterfowl. All designs were planned with the intent to maximize efficiency, productivity, and comfort for patients and staff. This even included rotating the original architectural

design ninety degrees to afford patient rooms either a view of the Olympic Mountain Range or of Mount Rainier (at least when the day is clear).

Madigan's clientele include all beneficiaries in a designated catchment area, patients from the seven state health service region, and select patients transported here from the Pacific theater. Pools of patients come from Mountain Home, Malstrom, Fairchild, and McChord Air Force Bases; Bremerton, Seattle, and Whidbey Island Naval Facilities; the Coast Guard's Thirteenth District; and the Public Health Service. The catchment area population consists of 236,856 Department of Defense beneficiaries made up of active duty soldiers, sailors, and airmen, and their dependents as well as retirees and their families. Madigan has over a million outpatient visits and 21,000 admissions annually. Its number of outpatient visits is exceeded in the Department of Defense only by Wilford Hall Air Force Medical Center in San Antonio.

Madigan has standing affiliations with over one hundred schools and hospitals. Fifty schools and universities send students here for training. It is also one of the largest medical trainers in the Army. There are currently seventeen medical residency programs and ten fellowship programs that are filled by 251 physicians. Other active training programs include the second phase of the nursing anesthesia program, a perioperative nursing course, phase two of the 91C (Licensed Practical Nurse) course, and other 91 (medical) series specialty

courses. Phase I, II, and operating room refresher training for the enlisted medical proficiency training (MPT) program as well as programs for physician assistants, podiatrists, psychologists, and health care administrators are overseen by Madigan staff. The staff consists of over three thousand civilian, officer, and enlisted employees. There is a significant turn-over rate in military personnel annually.

In conjunction with the move to a new facility, there has been an impetus to experiment and integrate new medical and business practices into the normal or usual work routine. This impetus is coming from the impending need to actively compete with the civilian sector for patients and health care dollars. President Clinton's proposed health care reform plan calls for an increase in managed care or "managed competition". Madigan Army Medical Center and its command group have been actively pursuing this idea and concept. To meet the goal of being "competitive", as well as satisfying JCAHO requirements, the command has chosen to actively implement Total Quality Management (TQM) and its associated principles.

One of the foundations of TQM is the idea of continuous quality improvement (CQI). One method of enhancing CQI is to use multi-disciplinary or specialty groups to review and analyze various clinical and administrative processes. These groups are known as Quality Action Teams (QATs), or Quality Management Groups (QMGs). One of the initial groups formed was the surgical process action team (PAT), which is synonymous with QAT. This

team was "chartered" to review the surgical process and make recommendations for changing the process that would result in higher quality. Quality was defined as conserving resources, while providing the same or better standards of care. One of this group's recommendations was that Madigan institute a standardized admission process.

A component of the admission process would be the establishment of a Pre-Admission unit (PAU) for elective and routine surgeries. It was hoped that the establishment of this new unit would have beneficial impacts on the area of resource utilization and management. The new admission process and the PAU have now been operating for approximately fourteen months, but there has been no empirical comparisons or analysis with past performances to determine if the process has actually decreased the average length of stay (ALOS) for surgical patients, or had other beneficial impacts on the area of resource utilization and management.

The "new process" for admission requires that a physician conduct a patient history and physical prior to recommending surgery. The patient is then given a date and time to report to the PAU for clinical workups, education, and counselling concerning the upcoming surgical procedure. The patient's record, to include the patients history and physical exam, is sent to the PAU to await the appointment date.

The PAU was designed as a central processing point or "one stop shop" for patients who would be undergoing elective and

routine surgeries that could be done on an ambulatory basis or that would require admission to an inpatient ward following surgery.

The PAU consists of seven different stations where:

(1) A PAU clerk initiates the pre-admission file and prepares the appropriate laboratory test slips.

(2) A patient administration (PAD) clerk pre-registers the patient using an admission and coding form. The PAD also determines if the patient has supplemental insurance and begins the process of obtaining pre-certification and obtains consent.

(3) A PAU nurse is responsible for several tasks, to include completing the nursing assessment, coordinating consultation appointments, completing pre-operative education of the patient, coordinating the "reach to recovery" program for mastectomy patients, insuring the consent forms are present and completed and beginning the discharge planning process.

(4) An operating room nurse completes the preoperative nursing assessment and initiates the clinical care plan.

(5) A PAU staff member takes vital signs, height, and weight; explains the ward rules if a patient is to be admitted to a ward following surgery; and orients the patient to the nursing call system and medical bed operation.

(6) An anesthesia provider, which may be either an anesthesiologist or nurse anesthetist, evaluates and counsels the patient on the type of anesthesia to be used during the operation. He/she explain anesthetic risks and what the patient

will be required to do or not do before reporting for surgery, i.e. nothing to eat or drink after 6 p.m. the day prior, administration of an enema, etc.

(7) The testing site consists of stations where electrocardiograms (EKGs) are performed and any blood or urine is collected as required. Any Radiographic imaging or testing that must be done, still occurs in the Radiology Department.

This arrangement is in general agreement with the models of other PAUs described in the literature (Allison, 1992; Rost 1991; and Marker, 1989).

Each station in the PAU is supposed to function as an additive procedure, not a duplicative one. It is designed so that all the vital information about the patient is obtained while also providing the patient with necessary orientation and education. Prior to the establishment of the PAU, the patient was required to go from one location in the hospital to another to fill out the admission forms, have blood drawn for testing, be counseled by the anesthesia personnel, be assessed and educated by nursing personnel, etc. It was a very time consuming process that presented numerous opportunities for breakdowns in communications. These breakdowns could result in vital laboratory or radiographic test results being lost or misplaced. Lost diagnostic test results created a great potential for delay or cancellation of surgery, or at least redoing the test. The process was very inconvenient and bothersome to the patient, as well as costly to the organization. Under the old admission

process the patient was generally admitted the day prior to surgery to insure that all the proper tests, paperwork and other miscellaneous procedures had been accomplished.

It was hoped that the establishment of the PAU would decrease the amount of time and resources needed to "in process" a patient and allow for better communications between the major players in a surgical episode. As a result of improved communications and admission procedures there were expected resource utilization dividends. These dividends were further expected to include a decrease in the length of stay (LOS) of surgical patients, a minimization in the number of surgical cancellations, an enhancement in the amount of third party reimbursements from supplemental insurance, and an improvement in patient satisfaction. It was also believed that the process would be more convenient for the physicians while providing better quality of care for the patients. This study will focus on using accepted research and statistical methods to determine if the use of the new admissions process and the PAU has had any beneficial impact on the ALOS of surgical patients at MAMC.

B. Statement of the Problem

Has the new admission process had a beneficial influence on resource utilization, as measured by the decrease in the length of stay for patients who have had a surgical episode?

C. Literature Review

During these times of continually constrained resources, many institutions and administrators are seeking new, inventive, and proactive methods of improved utilization of all available resources. One of these ideas of better utilization management is the creation and operation of a pre-admission unit.

Prior to 1986 there was very little literature concerning pre-admission units or their benefits to a health care facility. Even though many hospitals now employ some form of a pre-admission unit or process there is still sparse literature that explores and explains the various methods of structuring a process or PAU as well as the effects each variation has had on the delivery and quality of health care. Among the many variations of PAUs, some of the programs are contained within the Utilization Management/Quality Assurance department, some work directly for the admissions office, while others report to the nursing department (Marker, 1989). The effects of these various reporting structures have dramatic impacts on the mission and "personality" of the pre-admission unit. Those units that report to the comptroller or resource management division tend to only emphasize verification of insurance and obtaining authorization for treatment. Those units who report to the Department of Nursing tend to be more patient focused and stress patient education and preparation (Zoloft, 1993)

No matter which department the PAU works for, the single most important aspect of the implementation and efficient operation of the unit is continuous and comprehensive communication between all involved departments (Allison, 1992). This communication net must involve the utilization management personnel, the department of nursing, the discharge planner, the admissions office, the ancillary services who provide support, and the physicians (Marker, 1988).

Pre-admission planning can no longer be a simple clerical activity operated and isolated by the hospital admitting department. It is now an interdisciplinary activity meeting the combined interests of utilization management, the business office and nursing (Marker, 1986)

Among those reports and quantitative analyses published many have reported average decreases in lengths of stay from .5 days (Smeltzer and Flores, 1986) to 1.25 days (Worley, 1986) to 2.31 days (Goldbloom and Macleod, 1984). In a few of the cases the decrease was less than the loss of just one pre-operative day, but in many others the decrease in LOS was much greater than the expected one day decrease. Other studies, regarding accelerated surgical stay programs, which have relied heavily on pre-admission testing, education and counseling have demonstrated an average decrease in the LOS of 37.5% (Baxter, 1991)

In a well run PAU, emphasis on patient education has contributed to a decrease in length of stay greater than one day. Detailed patient education that included pre-admission exercise

instruction resulted in patients performing significantly more of the exercise behaviors than patients who did not receive such pre-admission instruction (Rice, 1984). In addition, several studies have found that patients who received detailed pre-admission instruction required fewer analgesics, reported better comfort levels during the post-operative period, and returned to their normal routine sooner following discharge (Fortin and Kirouac, 1976 and Rost, 1991).

The "savings" from pre-admission testing or screening are numerous. Studies have reported a higher incidence of repeated radiological and blood chemistry tests on patients who are admitted under a conventional system rather than through a pre-admission testing and teaching unit (Kahan, Carel, and Hart, 1991). Other studies have shown that between seven and forty percent of patients admitted for surgery are medically unfit on the day of admission (Pring, et al, 1987; Ross and Watson 1988; and Porter 1985). It was found that even if patients were declared fit on pre-admission testing, a small number (four percent) would develop problems before being admitted. This number was only about half of what would have been expected if there was no pre-admission screening (MacDonald, Dutton, and Stott, 1992).

If a surgery is cancelled because a candidate is medically unfit upon admission, the hospital usually absorbs the cost and the considerable waste associated with it. Some of the waste and associated cost include: (1) processing the patient through the

admissions office; (2) lost revenue or ability to serve another patient due to downtime in the operating room (OR); (3) costs of setting up the OR in non-reusable supplies and reprocessing or sterilizing equipment; (4) staff time, whether it be physicians, nurses, or technicians; and (5) other surgical team's time who are also having to wait because of a cancelled surgery (Worley, 1986).

D. Purpose Statement and Hypotheses

The objective of the study will be to determine whether the new admission process has been successful in decreasing the ALOS of surgical patients. To achieve this objective this project will study the effect the new admission process, as represented by the Pre-Admission Unit, has had on the lengths of stay for selected surgical procedures.

The primary hypothesis is that the new admissions process has decreased the length of stay for surgical patients. The null hypothesis is that the process has had no effect on the length of stay of surgical patients. The independent variables will be implementation of the new admissions process (PAU), the specific surgical procedure, represented by a specific Diagnosis Related Group (DRG) number, the year, combination of year and PAU to form the variable Study Group. The dependent variable will be length of stay.

CHAPTER 2

METHODS AND PROCEDURES

This retrospective, quantitative project studied the impact of the new admission process, as represented by the Pre-Admission Unit, on LOS for surgical procedures conducted at Madigan Army Medical Center from May to September in 1992 and the same period in 1993. The resulting data will then be combined with data from the Medical Expense and Personnel Reporting System (MEPRS) to calculate possible fiscal savings.

To determine the impact of the new admission process on the LOS of surgical patients, the fifty most frequent surgical procedures from May to September for 1992 and May to September 1993 were reviewed. This was accomplished by running a total count or sum of all surgical procedures during the time periods as posted in the PASBA II database. The PASBA II database is the second generation database program of the Patient Administration System and Biostatistics Activity. It is an inpatient data retrieval program that contains the standard inpatient data record. The program is in all Army Medical Treatment Facilities.

Those surgical procedures related to the birthing experience, (episiotomy, circumcision, normal deliveries, caesarean deliveries, etc.), were not considered to be reliable indicators of the new admissions process' impact on routine

surgeries and were therefore excluded. Cardio-thoracic surgical procedures were also excluded on the basis that the service does not participate in the pre-admission process because the pre-operative work-up for their patients is more extensive and complicated than what is offered through the PAU. In addition, all surgeries that were performed on an outpatient or same day surgical basis were excluded because there is typically no associated LOS.

Of the remaining twenty-five most frequent inpatient surgical procedures the study was limited to six procedures from five different surgical services that had varying rates of compliance with the new admission process. This was done because it was felt that this number of surgical procedures would serve as a good cross section and reference pool with a large enough sample size without being too unwieldy. The number of services were also chosen to represent slightly more than a third of all the surgical services. In addition, one of the services, Urology, was represented by two different surgical procedures to serve as a random test to determine if there were any readily apparent differences in the compliance rates for different surgeries within the same service.

The PAU did not start to track the number of patients seen under the new admission policy from each surgical service until October 1993. Due to a lack of objective data at the start of this project, I relied on the experience of the PAU's head nurse in choosing which services and procedures demonstrated a high

compliance rate with the new admissions program, which ones had a low compliance rate and which one was the best representative of the average. This reliance on subjective experience and memory rather than objective data turned out to have limitations. Instead of the services representing a grand mean of compliance and usage, most of the services had slightly more than the average number of patients processing through the PAU. This slight weighting of studied services that were above the average in total numbers of patients processed through the PAU may slightly inflate the average compliance rate.

The six surgical Diagnosis Related Groups (DRGs) chosen to be studied were: (1) transurethral prostatectomy (DRG 602), (2) radical prostatectomy (DRG 605), both performed by the Urology service, (3) total abdominal hysterectomy (DRG 684), performed by the gynecological service, (4) cataract extraction (DRG 1359), performed by the opthamology service, (5) laparoscopic cholecystectomy (DRG 5123), performed by the general surgery service, and (6) excision of intervertebral disc (DRG 8051), performed by the neurosurgery service.

In this study when years or year groups are mentioned the time frame is May to September of each year and not the entire year. The total number of surgical cases reviewed and analyzed for this project was 525. Seven of the cases were eliminated because they had been performed on foreign nationals or were coded as civilian emergencies. Transfers and discharges of these types of patients were considered to have potentially skewed the

data. The final sample size was five hundred and eighteen (n= 518).

Data concerning the actual LOS and patient demographics was obtained through generation of a short record from the PASBA II data base. A short record is a report of an individual patient's unique hospital episode. This report provides a list of accompanying diagnoses and operations as well as demographic data and LOS as mentioned above. The short record reports were used to pull patient's charts for an individual chart review to determine which patients were processed through the PAU. The demographic data included age, race, gender, service organization, and duty status. The data was encoded and compiled in a spreadsheet format using the Microsoft Excel computer program. The statistical analysis of the data was accomplished using the StatView computer program.

The data concerning LOS came from the PASBA II short record and was verified by checking the actual admission and discharge dates in the patient record. This method of hand checking each record gives a reliability factor that nears 1.0. Some errors in the computations could have occurred through operator error or fatigue when cross checking or inputting the data. Whether a person was processed in accordance with the approved admission policy was determined by confirming the presence or absence of a pre-admission data report. This report, generated by the Madigan Clinical Information System as a part of the approved admissions process, is maintained in the patients medical record. The

physical presence of this report in the patient's record during the chart review served as the determining factor of whether or not the patient was processed according to the new admissions procedures.

There was no attempt to correlate matched pairs of patients for similar demographics and acuity. Rather, this study relied upon the "law of averages" and the theory of central tendency to generate similar pools of patients. To increase the validity of this technique, the cases studied were taken from the same time periods, (May to September) during consecutive years. This time period was also chosen for its suitability on the basis that it allowed the Madigan Army Medical Center staff to "settle in" for three months after moving into the new hospital in 1992. It also allowed the PAU staff to overcome initial "start up" problems for a two month period in 1993 associated with its inception and implementation. Comparing demographic results of the three study groups yielded no statistically significant differences and strengthened the validity of this method.

The timeframes were selected to control for and reduce the influence of unfamiliarity with a new facility or process. Using retrospective data for the two years also eliminated any bias that could have occurred due to the Hawthorne effect if the data had been collected for current cases.

This completely retrospective study mentions no individual patient names, or social security numbers, or other identifying

information. Therefore, there was no need for a statement of patient consent.

Statistical methods and calculations used included; (1) frequency distribution and Chi-square of demographic data, with (2) means and standard deviations for the age and LOS of the patients. An analysis of variance (ANOVA) was used in determining the effects of the independent variables of PAU, Year and DRG upon the dependent variable ALOS.

Initial results indicated that PAU admission had an effect on LOS, DRG admission had an effect on LOS, and DRG combined with PAU had an effect on LOS, but PAU, DRG admission and Year combined had no statistical significance on LOS. This likely occurred because there were too many interactions among the three groups (92 Non-PAU, 93 Non-PAU, and 93 PAU) and the six DRGs. To verify this assumption a post hoc test, Fisher's Protected Least Significant Difference (Fisher's PLSD), was employed to examine the mean values of LOS for each study group by individual DRG.

Fisher's PLSD test is based on the assumption that a significant F-ratio for each group has been defined as having a reported p-value less than a pre-specified significance level. The procedure then evaluates all possible pairwise comparisons with a multiple t-statistic. It determines the critical value to be exceeded, for any pair of comparisons, on the basis of the maximum number of steps between the smallest and largest mean. The original PLSD assumes equal sample size, but it may be implemented in a general way for use with unequal sample sizes as

well. Fisher's PLSD test was chosen specifically because it could be employed with unequal sample sizes. The probability of a type I error is inflated when the sample sizes are unequal (StatView, 1992).

CHAPTER 3

RESULTS

Of the total sample of 518 cases, 55.41% or 287 cases were from 1992. There were 231 cases in 1993 which accounted for 44.59% of the total population. In the 1993 year group 151 people or 65.37% were processed through the PAU. The remainder, 80 people or 34.63% of the cases were not admitted through the PAU. The 1993 PAU group accounts for 29.15% of the total sample while the 1993 non-PAU group accounts for 15.44% of the total sample. See Figures 1 and 2.

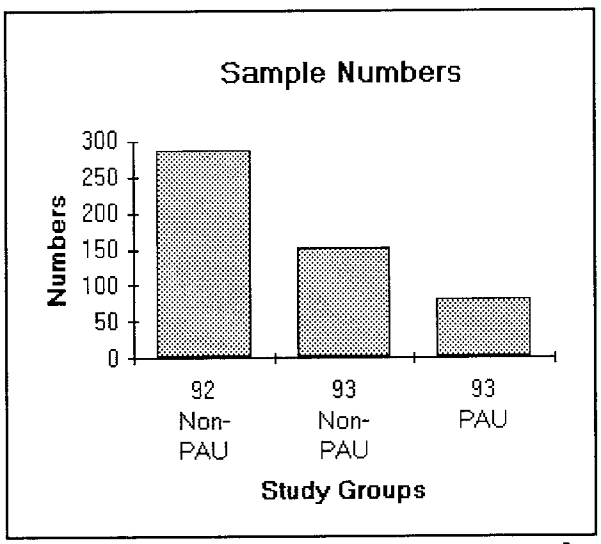

Figure 1 Study groups sample size

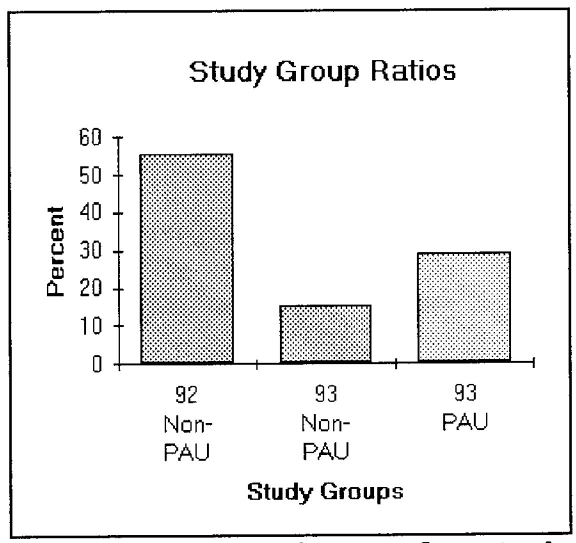

Figure 2 Ratios of study groups

The sample sizes were also not equally distributed among the DRGs. The difference in distribution among the study groups and DRGS was significant when using a Chi Square test with DF=10 and x^2=23.08, p<.05. Therefore, the study group affect on ALOS was split into 6 separate analysis based on DRG. See Figure 3 for a graphical presentation of the numbers of each DRG in each study group.

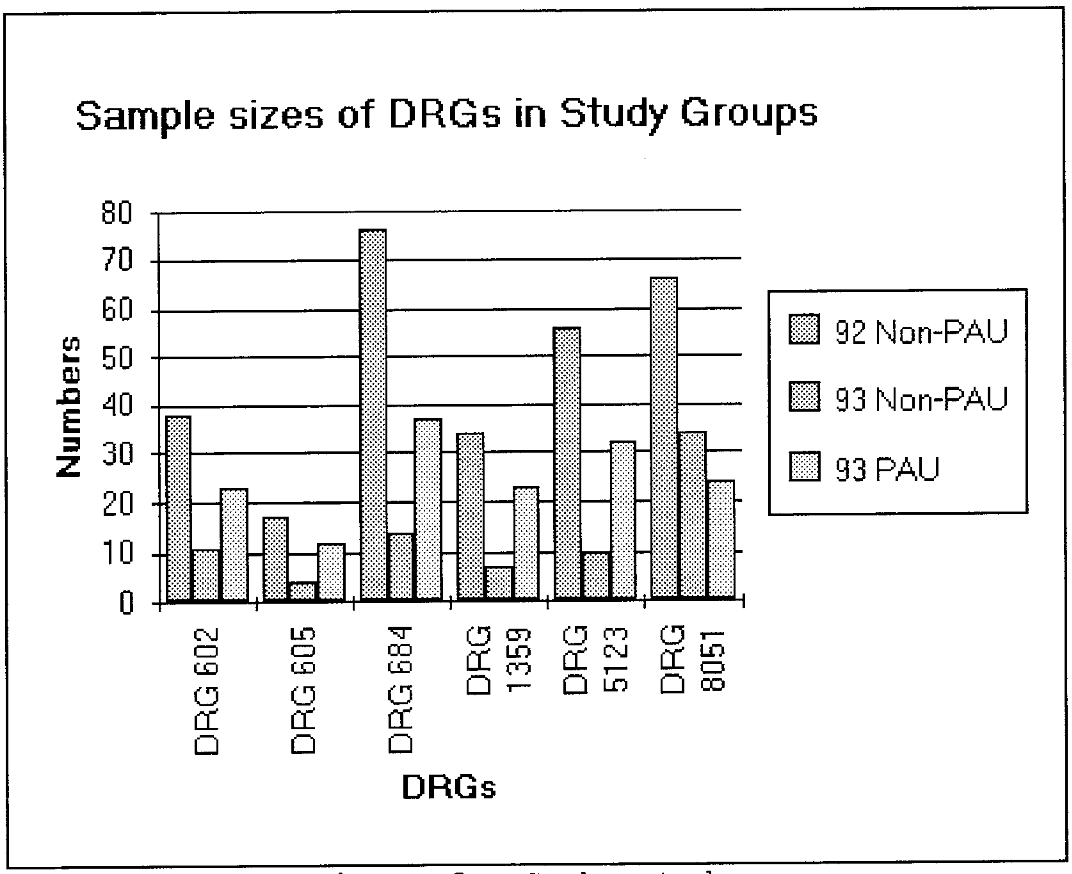

Figure 3 Sample sizes of DRGs by study group

The demographics of each set of individuals who had been processed through the PAU and those who had not were similar.

There was no statistical significance in differences when the results were checked utilizing a Chi Square test for significance.

Males accounted for 50.39% of the total sample studied and comprised 55.94% of the 1992 Non-PAU group, 56.25% of the 1993 Non-PAU group and 46.36% of the 1993 PAU group. Females accounted for 49.61% of the total sample and comprised 49.13% of the 1992 Non-PAU group, 43.75% of the 1993 Non-PAU group and 53.64% of the 1993 PAU group. The slight difference in gender makeup of the groups was not significant using a Chi Square test with DF=2 and x^2=2.11. See Figures 4 and 5 for gender composition numbers and ratios.

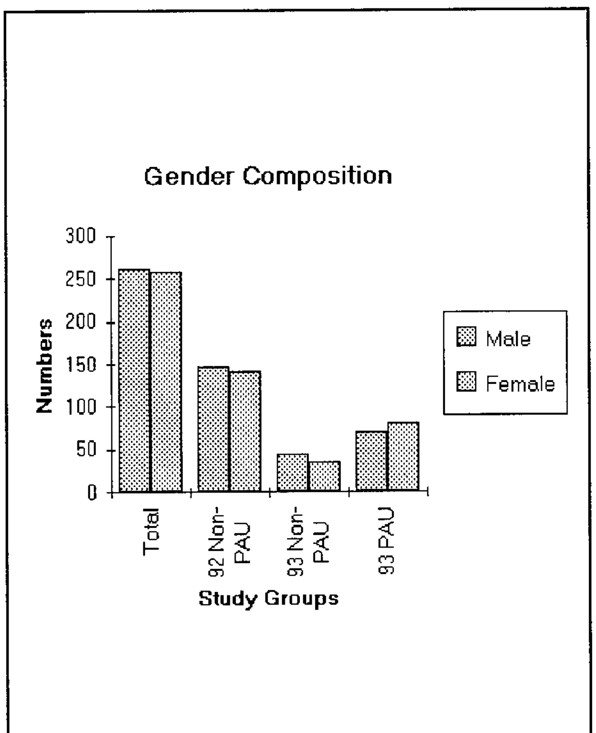

Figure 4 Gender composition of study groups

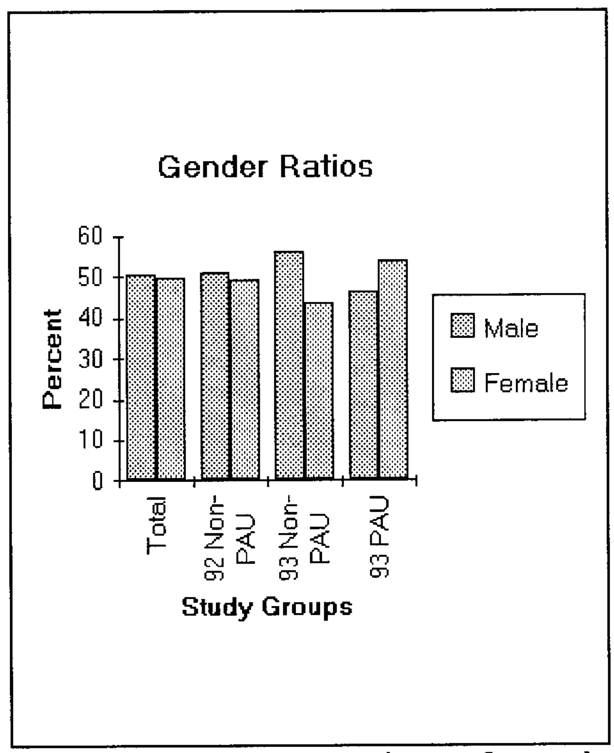

Figure 5 Gender ratios of study groups

Analysis of the ethnic and racial composition of the patients yielded the following results. People of Asiatic heritage accounted for 4.1% of the total sample and comprised 4.18% of the 1992 Non-PAU group, 2.5% of the 1993 Non-PAU group, and 4.64% of the 1993 PAU group. African-Americans accounted for 8.1% of the total and comprised 9.76% of the 1992 PAU group, 3.75% of the 1993 Non-PAU group, and 7.29% of the 1993 PAU group. Hispanics and Native Americans were grouped together and accounted for 5.4% of the total and comprised 4.18% of the 1992 Non-PAU group, 5.0% of the 1993 Non-PAU group and 7.95% of the 1993 PAU group. Caucasians accounted for 82.4% of the total and comprised 81.88% of the 1992 Non-PAU group, 88.75% of the 1993 Non-PAU group and 80.13% of the 1993 PAU group. While there was a large difference in the racial makeup of the study groups there was no statistical significant difference in racial composition between the three study groups using a Chi Square test with DF=6 and x^2=4.77. See Figures 6 and 7 for racial composition and ratios of study groups.

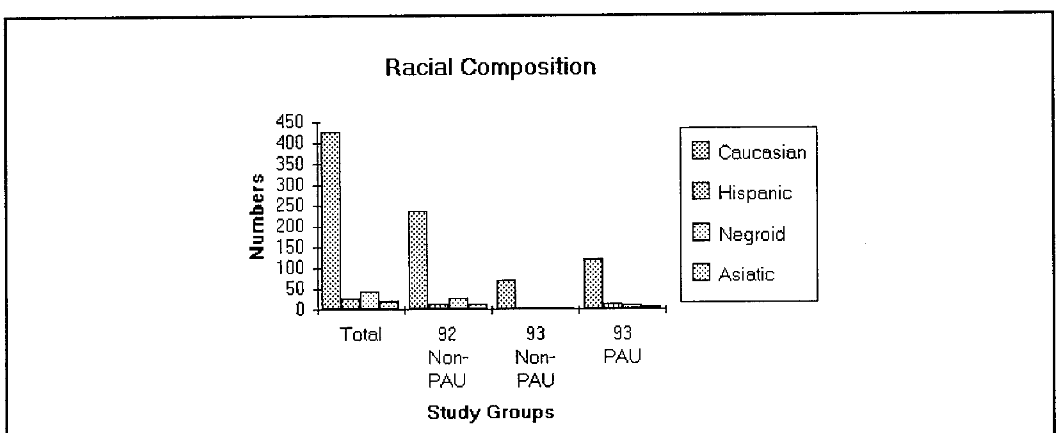

Figure 6 Racial composition of study groups

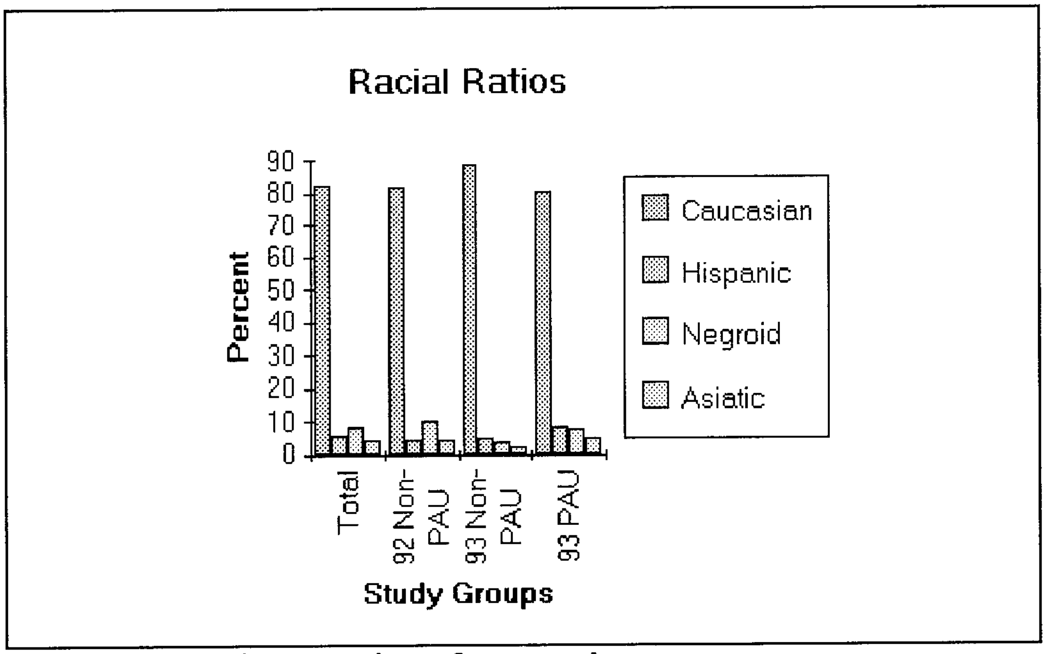

Figure 7 Racial ratios for study groups

The uniformed service composition consisted of the patient identifying which service they were serving, or had served with prior to retirement. The results of the service analysis consisted of the following: (1) Army personnel accounted for 59.46% of the total and comprised 62.37% of the 1992 Non-PAU group, 53.75% of the 1993 Non-PAU group and 56.95% of the 1993 PAU group, (2) the Air Force personnel composed 24.9% of the total and accounted for 22.65 % of the 1992 Non-PAU group, 27.5% of the 1993 Non-PAU group, and 27.82% of the 1993 PAU group, (3) Coast Guard personnel made up 2.32% of the total and accounted for 2.44% of the 1992 Non-PAU group, 3.75% of the 1993 Non-PAU group, and 1.33% of the 1993 PAU group, (4) the Navy personnel comprised 12.74% of the total and accounted for 11.85% of the

1992 Non-PAU group, 15% of the 1993 Non-PAU group, and 13.25% of the 1993 PAU group, (5) the Marine Corps were the smallest section of uniformed personnel and accounted for .58% of the total. They comprised .70% of the 1992 Non-PAU group, 0.00% of the 1993 Non-PAU group, and .66% of the 1993 PAU group. There were no statistically significant differences in service distribution among the study groups using a Chi Square test with DF=8 and x^2=4.77. See Figures 8 and 9 for a graphical presentation of the service composition and ratios.

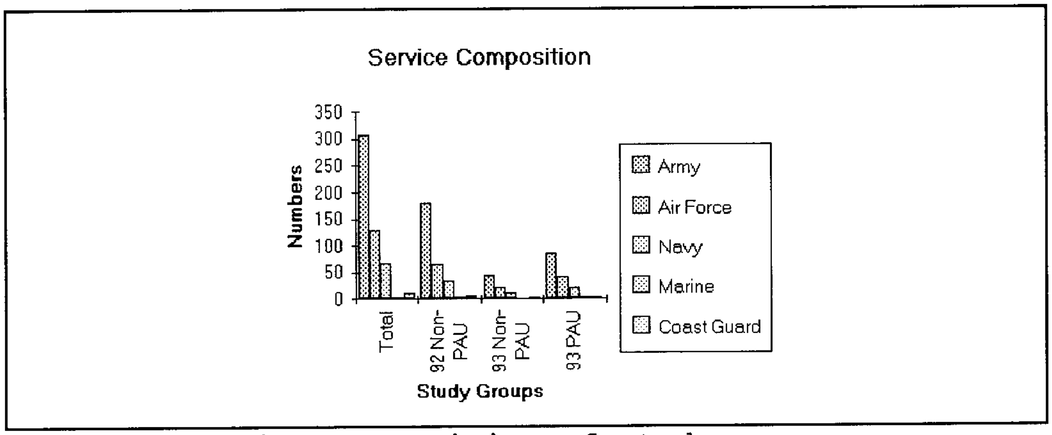

Figure 8 Service composition of study groups

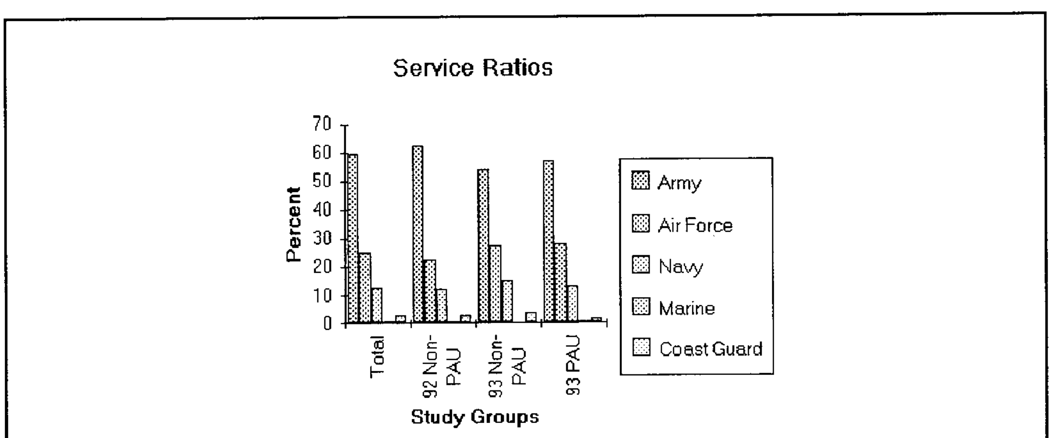

Figure 9 Service ratios of study groups

The sample was also looked at in regards to the status of the person involved in the surgical procedure. The status of the personnel considered were active duty, dependent of active duty, retired and dependent of retired. Active duty personnel accounted for 19.88% of the total and comprised 20.56% of the 1992 Non-PAU group, 23.75% of the 1993 Non-PAU group, and 16.56% of the 1993 PAU group. Dependents of active duty personnel accounted for 3.28% of the total and comprised 3.83% of the 1992 Non-PAU group, 3.75% of the 1993 Non-PAU group, and 1.99% of the 1993 PAU group. Retirees accounted for 33.78% of the total and comprised 33.80% of the 1992 Non-PAU group, 32.50% of the 1993 Non-PAU group, and 34.44% of the 1993 PAU group. Dependents of retired personnel accounted for 43.06% of the total and comprised 41.81% of the 1992 Non-PAU group, 40.0% of the 1993 Non-PAU group and 47.02% of the 1993 PAU group. See Figures 10 and 11 for a graphical presentation of status composition and ratios of study groups.

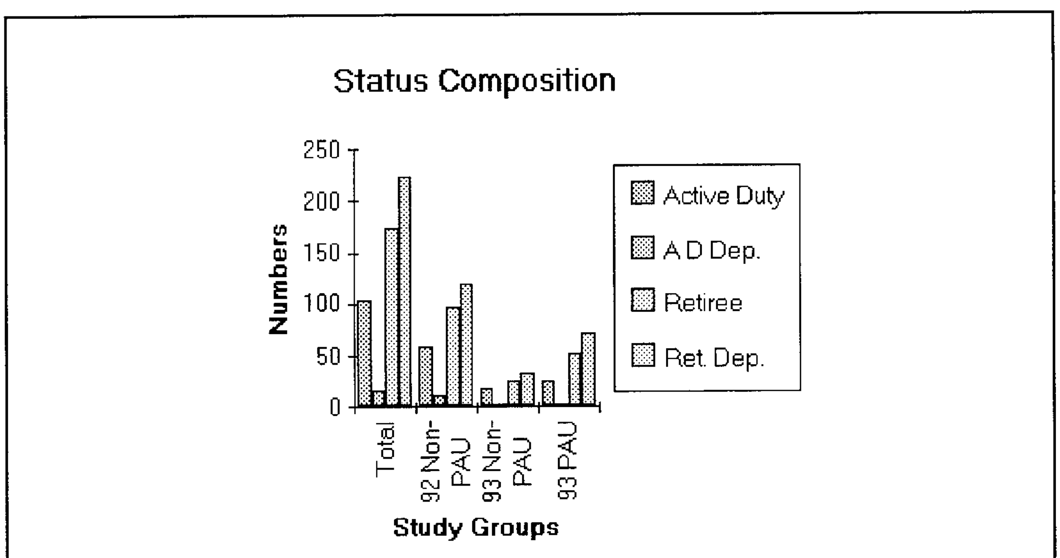

Figure 10 Status composition of study groups

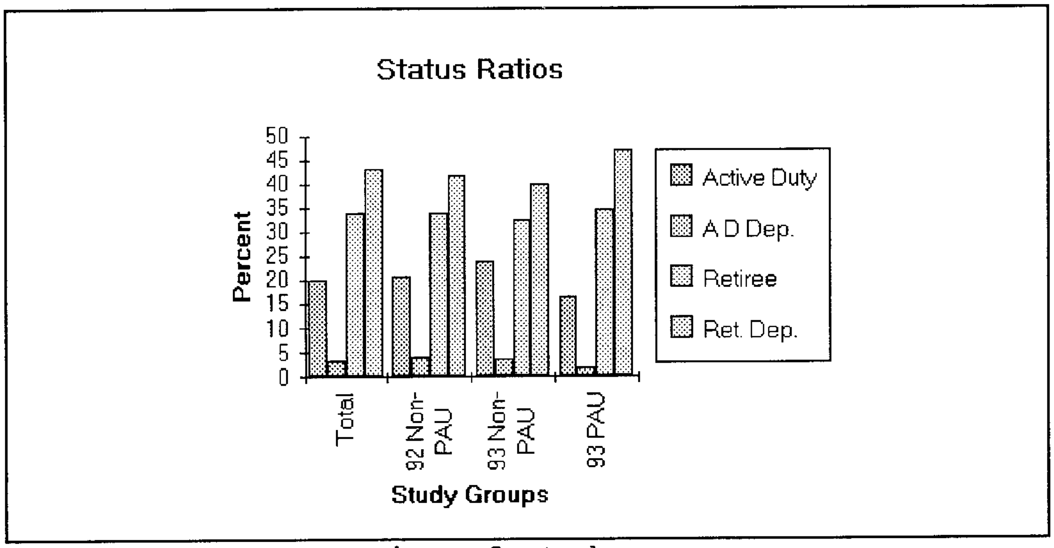

Figure 11 Status ratios of study groups

There was a disparity of services provided for retired personnel and their dependents versus the service provided active duty personnel and their dependents. This disparity is explained by the bias inherent in the choosing of surgical procedures that are considered "retiree surgeries", i.e. prostatectomies, cataract extractions, hysterectomies and cholecystectomies. There was no statistically significant difference in status composition between the study groups using a Chi Square test with df=6 and x^2=3.48.

The lack of statistical difference in the demographic composition among the studied groups adds strength to the use of the central tendency theory in generating the sample study groups. Detailed summary tables for gender, race, service and status composition are available in Appendix A.

The average age of those people being admitted through the PAU was 50.72 years with a standard deviation of 16.80 years. The average age of the people that were not admitted through the PAU in 1993 was 46.98 years with a standard deviation of 18.51 years. The mean age in 1992 was 49.1 with a standard deviation of 17.1 years. An analysis of variance shows that age was significant in relation to the particular DRG with F (5, 512) = 97.19 and $p < .05$. Age was not significant in relation to admission through the PAU with F (1, 516) = .08 and p =.78. Age was also not significant in the interaction of PAU and DRG with F (5, 512) = 1.146 and p = .34. Nor was age significant in relation to the study groups, F (2, 515) = .171 and p = .84. These results were expected. See Figures 12 and 13 for a graphical presentation of age within the study groups and for each DRG. Further detailed tables and graphs are available in Appendix B.

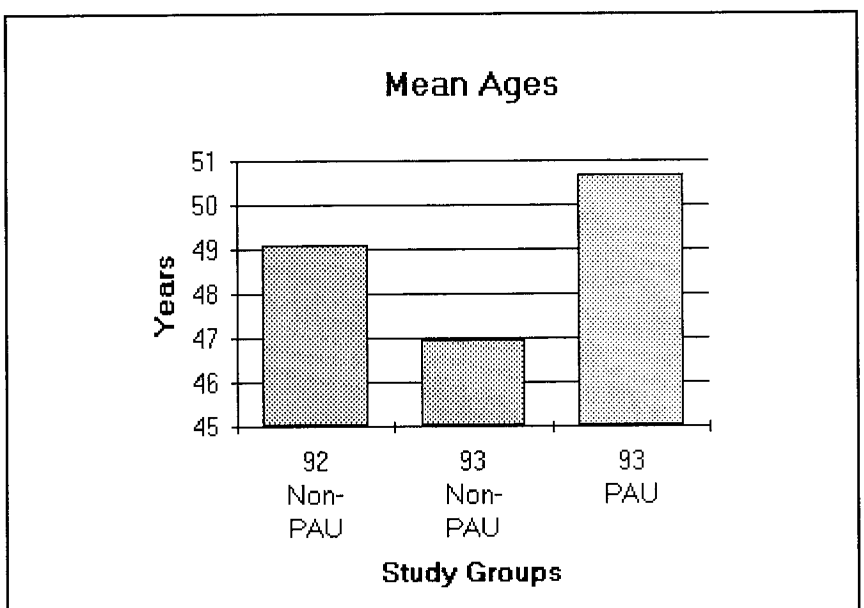

Figure 12 Mean ages of the study groups

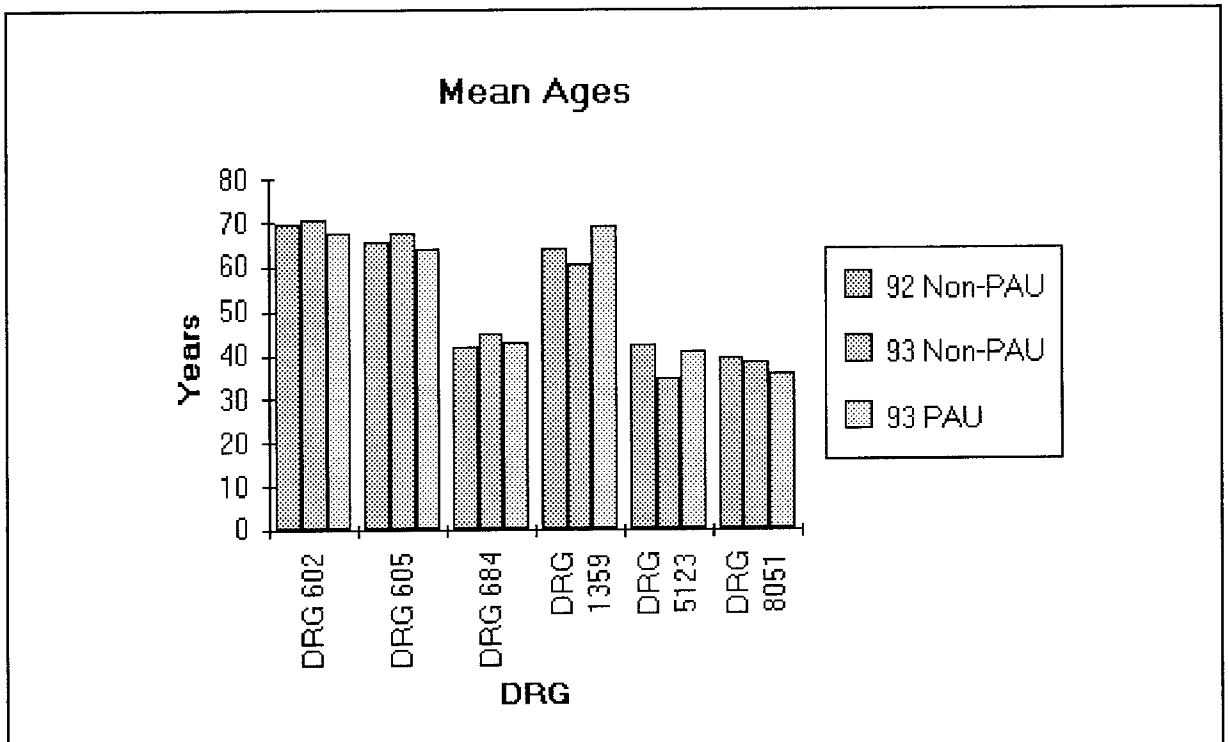

Figure 13 Mean ages for each DRG in each study group

A two-way analysis of variance calculation indicates that each of the variables, PAU and DRG, had a statistically significant effect on the length of stay. The variable PAU is significant with $\underline{F}$ (1, 516) = 41.27 and $\underline{p}<.05$. There was a 2.3 day decrease in ALOS for those patients admitted through the PAU. See Figure 14 for a graphical presentation of the effect of the variable PAU on the ALOS of the total sample.

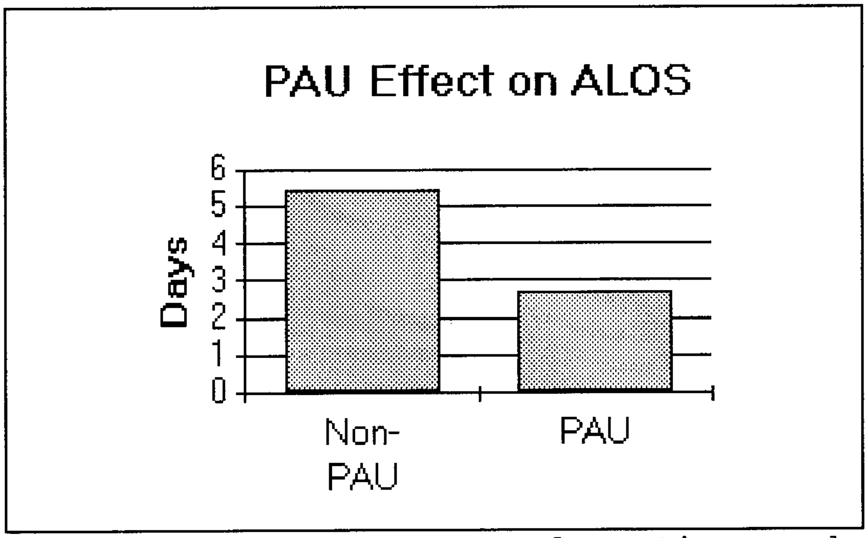

Figure 14 PAU Effect on ALOS for entire sample

The variable, DRG, is significant with F (5, 512) = 27.52 and $p<.05$. See figure 15 for a graphical presentation of the ALOS for each DRG not split by PAU or study group.

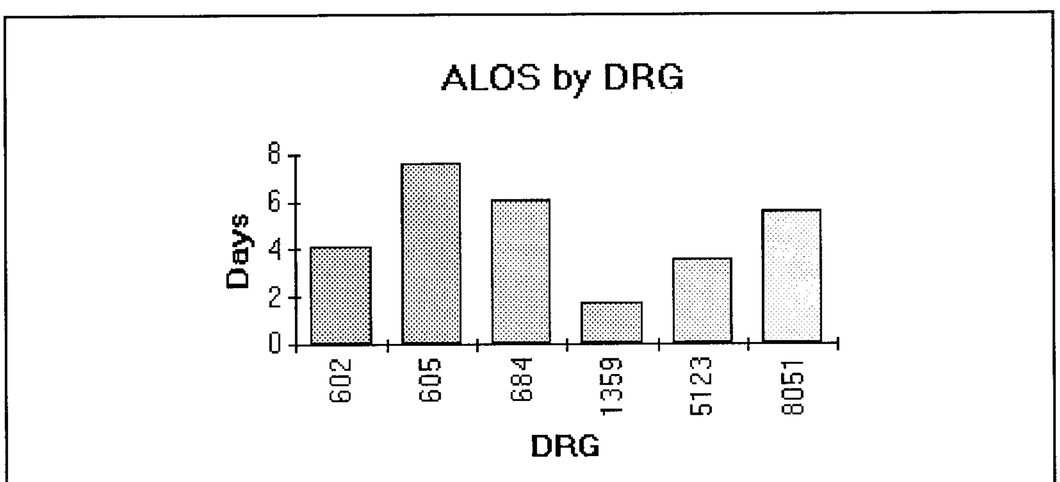

Figure 15 DRG effect on ALOS for the entire sample

The effect of combining the variables PAU and DRG still produce significant results with F (5, 512) = 22.60 and $p<.05$ (actual $p=.0193$). See Figure 16 for a graphical presentation of the effects on ALOS of PAU and DRG combined.

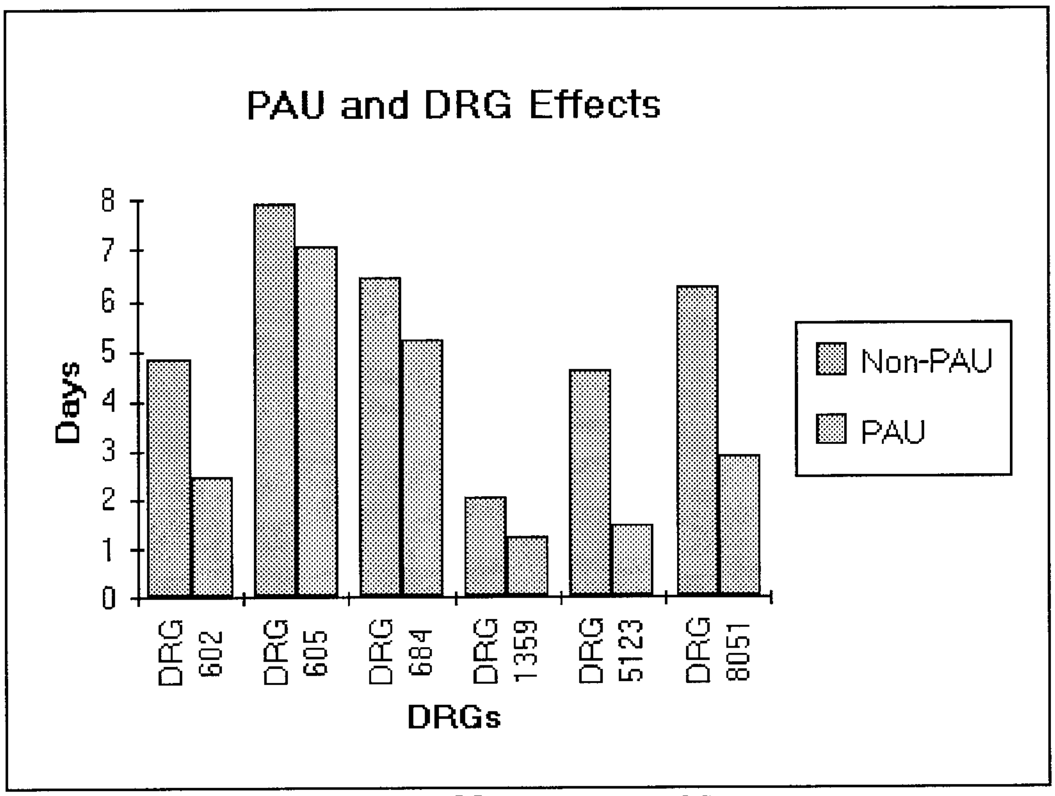

Figure 16 PAU and DRG effects on ALOS

The effects of combining the variables Year and PAU to form the new variable Study Group is also significant, with F (2, 515) = 21.0 and $p<.05$. See Figure 17 for a graphical presentation of the effect the new variable study group, has on ALOS.

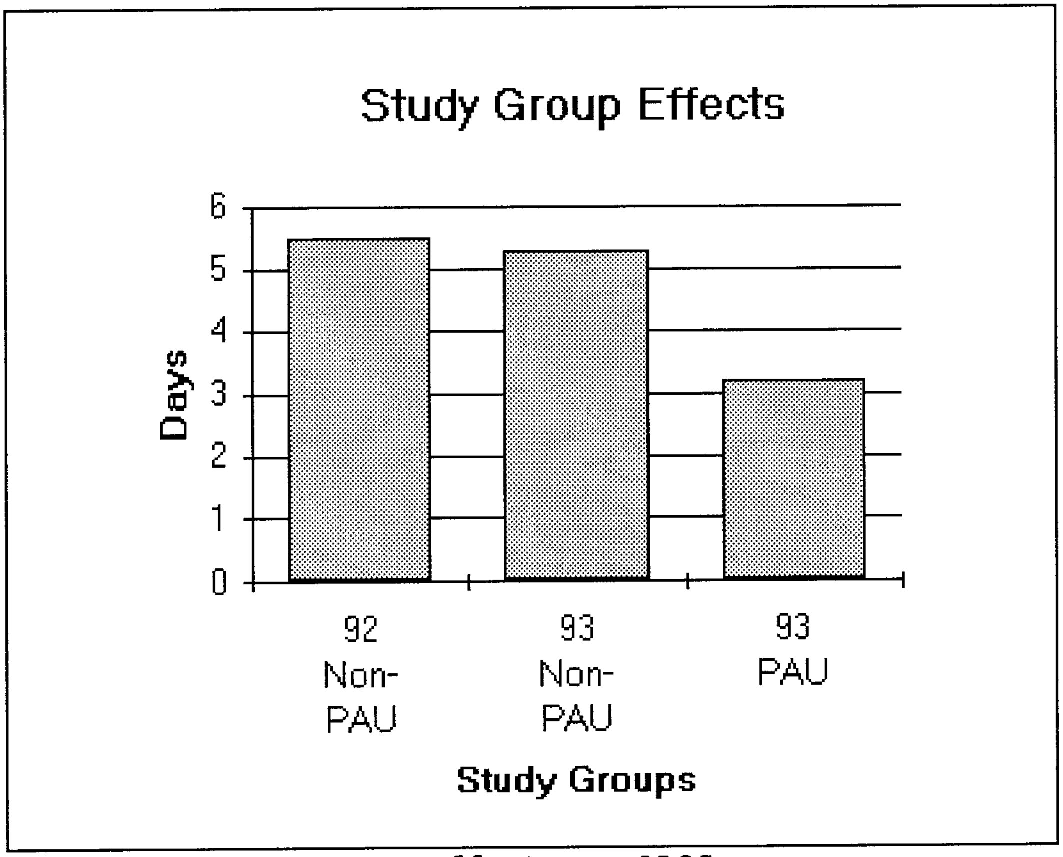

Figure 17 Study Group effects on ALOS

Combining the variables DRG, Year, and PAU (or DRG and Study Groups) produces results that are not significant, $\underline{F}$ (10, 507) = 1.50 and $\underline{p}$=.14. Since all other combinations of variables produced results that were significant, the non-significant results are probably the result of the increased number of interactions among the variables DRG, Year and PAU. See Figure 18 for a graphical presentation of the effects on ALOS of combining Study Groups and DRGs. More detailed tables and

graphs depicting the results of the statistical calculations and the effects of the variables on ALOS can be found in Appendix C.

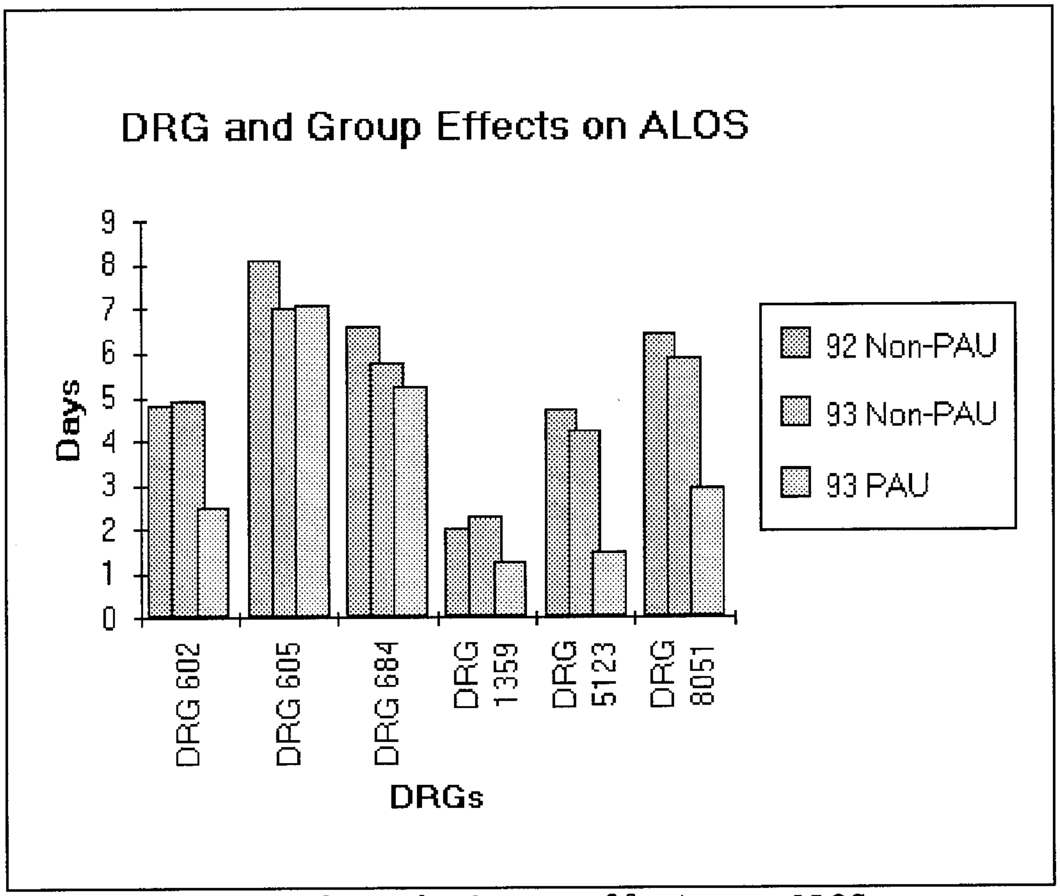

Figure 18 DRG and Study Group effects on ALOS

Due to the possibility that the non-significant results were the product of the increased number of interactions between the variables, a comparison of means effected by the variables study group and DRG combined was conducted. This analysis included checking an intergroup comparison of means for each individual DRG using Fisher's PLSD test. The following information for the total sample was obtained: (1) Those patients who were not

admitted through the PAU had an ALOS of 5.45 days with a standard deviation of 3.51 days. (2) Those patients who were admitted through the PAU had an ALOS of 3.19 days with a standard deviation of 2.64 days. This depicts an average decrease in the length of stay for the six selected inpatient surgical procedures of 2.26 days, and a corresponding decrease in the standard deviation of .87 days (Appendix C). Both, the decrease in ALOS and the subsequent decrease in associated standard deviation are favorable results.

Further analysis employing Fisher's PLSD and the intergroup comparison among the groups 1992 Non-PAU, 1993 Non-PAU and 1993 PAU reveal the following: (1) the 92 Non-PAU group had an ALOS of 5.50 days with a standard deviation of 3.47, (2) the 93 Non-PAU group had an ALOS of 5.28 days and a standard deviation of 3.66 and (3) the 93 PAU group had an ALOS of 3.19 days with a standard deviation of 2.64. This analysis helps control for any improvements in technology or technique between the years, which yielded an ALOS decrease of .22 days between the 1992 and 1993 Non-PAU groups. The intergroup comparison of the 1993 data (PAU vs. Non-PAU) using Fisher's PLSD shows a decrease in ALOS of 2.08 days as compared to 2.23 days between the 1992 Non-PAU and the 1992 PAU group. These results are significant with $\underline{p}<.05$. Tables and charts depicting these results are available in Appendix D.

Further refinement of each group mean into the separate DRGs shows a consistent trend of decrease in ALOS for five of the six

procedures that were admitted through the PAU and can be seen in both table and graph format at Appendix D and in Figures 17 and 18. The one exception to this trend is DRG 605. The probable cause for this variance is the small number of cases (4) that were not admitted through the PAU in 1993. It is interesting to note that the ALOS for two of the procedures, DRG 602 and 1359, increased between the 1992 Non-PAU and the 1993 Non-PAU groups even though there was a .22 day decrease in ALOS overall. These variances could also be the result of the smaller number of admissions in the 1993 Non-PAU group than in the 1992 Non-pau group.

The urological procedure of transurethral prostatectomy, DRG 602, was the fourth most frequent surgical procedure with n=72. Radical prostatectomy, DRG 605, had the fewest number of occurrences in this study with n=33. Transurethral prostatectomy patients accounted for 13.9% of the total surgeries reviewed and had a compliance rate of 67.65% which accounted for 15.23% of the patients who were processed through the PAU. Radical prostatectomy patients accounted for 6.37% of the total surgeries reviewed, but had a compliance rate of 75% which accounted for 7.95% of the patients who were processed through the PAU. Combined, these two urological procedures have a sample size of n=105 and account for 20.27% of the surgeries with a compliance rate of 70%, which comprise 23.18% of the patients who were admitted through the PAU. The decrease in ALOS for DRG 602 between both Non-PAU groups and the PAU group was statistically

significant, F (2, 69) = 7.65 with $p < .05$. The decrease in ALOS between the groups for DRG 605 was not statistically significant, F 2, 30) = 1.85 with $p = .18$. A graphical presentation of the changes in ALOS for both DRG 602 and 605 can be seen in Figure 19. More detailed tables and graphs of DRG 602 and DRG 605 can be found in Appendix D.

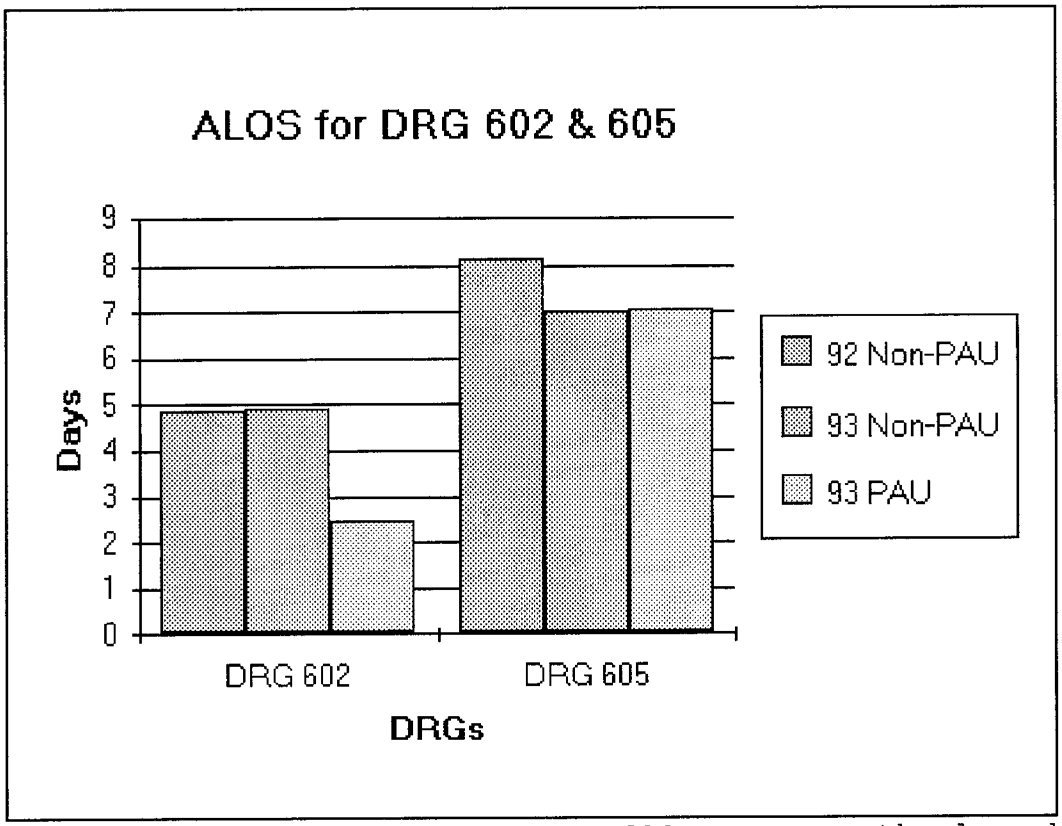

Figure 19 ALOS for DRG 602 & 605, Transurethral and Radical prostatectomy

The gynecological surgical procedure of complete hysterectomy, DRG 684, was the most frequent procedure with a total sample size of n=127. This accounted for 24.52% of the

surgical cases analyzed. This total was based on 76 patients during 1992 and 51 patients during 1993. In this study, total abdominal hysterectomy accounts for 24.5% of the total number of patients that were properly in processed according to the new admission policies. This number mirrors the percentage of total surgical procedures that were hysterectomies. During the time period of the new admission processes 72.55% of the patients admitted were in compliance with the new admission procedures. This made the Department of Obstetrics/Gynecology the fourth most compliant service of the five services studied. The ALOS for the 1992 Non-Pau group was 6.58 days, for the 1993 Non-PAU group it was 5.79 days and for the 1993 PAU group it was 5.24 days. This difference in ALOS between the 1992 Non-PAU and 1993 PAU groups was statistically significant, with $\underline{p} < .05$, even though the difference in ALOS for the total of DRG 684 was not significant, $\underline{F}$ (2, 124) = 2.32 with $\underline{p}$ = .10. A graphical presentation of the changes in ALOS can be seen in Figure 20. More detailed charts and tables of DRG 684 may be found in Appendix D.

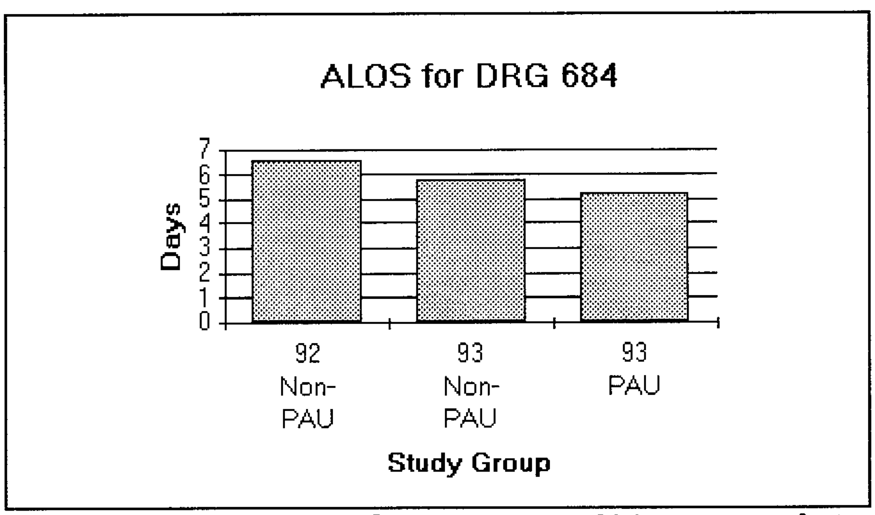

Figure 20 ALOS for DRG 684, Complete hysterectomy

Cataract extraction, DRG 1359, by the Ophthalmological Service had a sample size of n=64. Thirty of the procedures were performed in 1993, with 23 being admitted through the PAU, and 34 extractions were performed in 1992. Ophthalmology had the highest compliant rate of all the services with 76.67% of their patients being admitted through the PAU. Cataract extraction accounted for 12.36% of the surgeries studied but accounted for 15.23% of the patients who processed through the PAU. The changes in ALOS between the study groups were statistically significant, $\underline{F}$ (2, 61) = 3.97 and $\underline{p}<.05$. A graphical presentation of the changes in ALOS can be seen in Figure 21. More detailed tables and graphs of DRG 1359 are available in Appendix D.

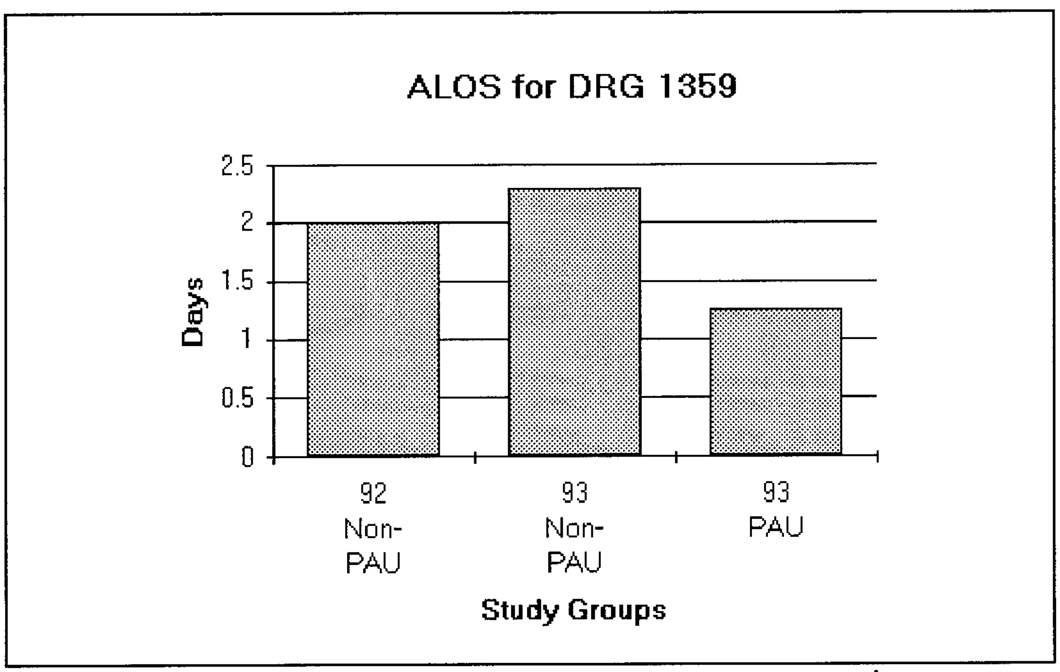

Figure 21 ALOS for DRG 1359, Cataract Extraction

Laparoscopic cholecystectomy, DRG 5123, was the third most frequent procedure with a sample size of n=98. There were 56 laparoscopic cholecystectomies performed in 1992 and 42 in 1993, with 32 being processed through the PAU according to the accepted process. General Surgery had the second highest compliance rate with 76.19% of their patients being properly processed, they accounted for 21.19% of the patients processed through the PAU even though this DRG accounted for only 18.92% of the total surgeries reviewed. The 1992 Non-PAU group had an ALOS of 4.70 days while the 1993 Non-PAU group had an ALOS of 4.20 days and the 1993 PAU group had an ALOS of 1.47 days. The changes in ALOS among the groups, especially the decrease in ALOS between both Non-PAU groups and the PAU group, were statistically significant, $\underline{F}\ (2, 95) = 8.83$ with $\underline{p} < .05$. The 3.23 day decrease in ALOS between the 1992 Non-PAU and the 1993 PAU groups was the second largest decrease in ALOS. A graphical presentation of the changes in ALOS can be seen in Figure 22. More detailed tables and graphs of DRG 5123 are available in Appendix D.

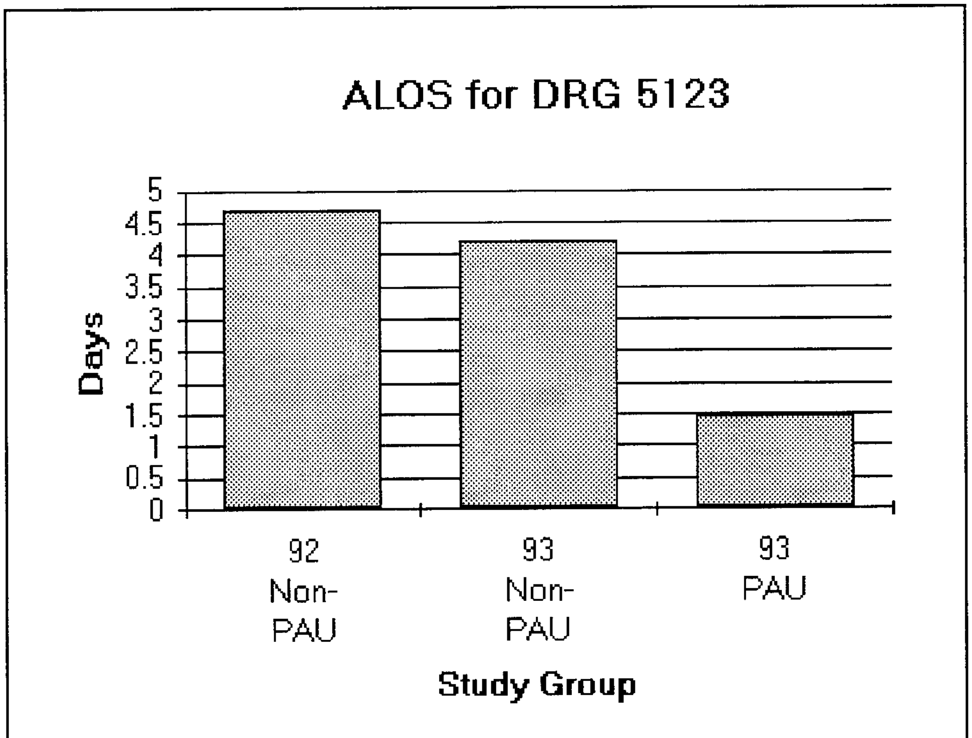

Figure 22 ALOS for DRG 5123, Laparoscopic cholecystectomy

Excision of an intervertebral disc or diskectomy, DRG 8051, was the second most common procedure with a sample size of n=124. There were 66 diskectomies in 1992 and 58 during 1993. This DRG accounted for 23.94% of the reviewed surgical procedures. While diskectomy accounted for nearly a quarter of the total surgeries involved in this study, it only accounted for 15.9% of the patients processed through the PAU. Only 24 of the 58 patients admitted for diskectomy in 1993 were admitted according to the new admission process. This gave the Neurosurgical Service a compliance rate of 41.38%. This was the lowest rate of

compliance among the services involved. The 1992 Non-PAU group had an ALOS of 6.42 days, while the 1993 Non-Pau group had an ALOS of 5.91 days and the 1993 PAU group had an ALOS of 2.92 days. The changes in ALOS among the groups, especially the decrease in ALOS between both Non-PAU groups and the PAU group, were statistically significant with F (2, 121) = 10.79 and $p < .05$. The 3.5 day decrease in ALOS between the 1992 Non-PAU group and the 1993 PAU group was the largest decrease in ALOS among any of the groups and DRGs studied. A graphical presentation of the changes in ALOS for DRG 8051 can be seen in Figure 23. More detailed charts, and graphs of DRG 8051 are available in Appendix D.

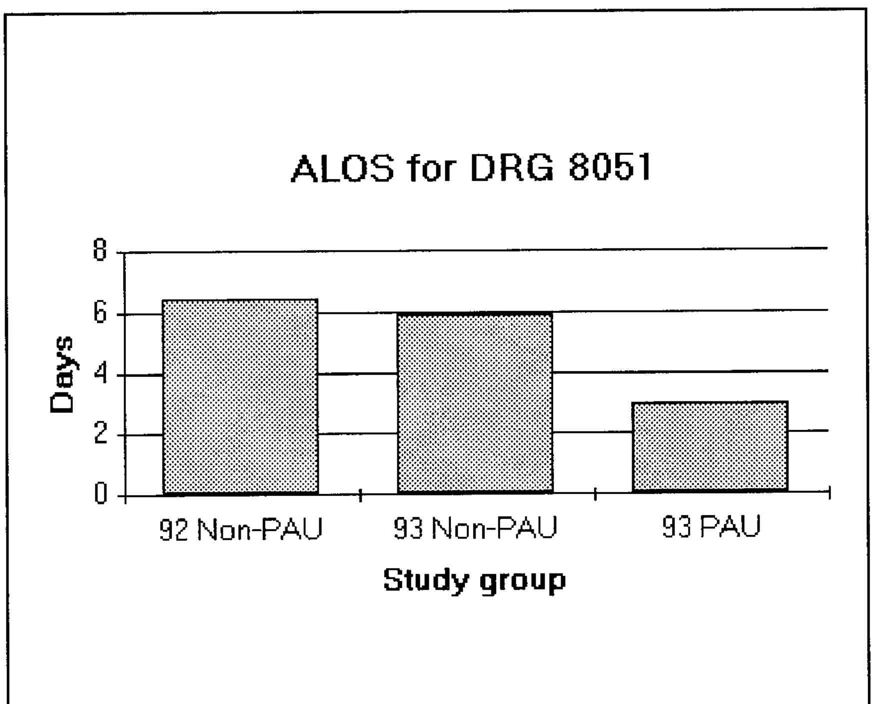

Figure 23 ALOS for DRG 8051, Diskectomy

CHAPTER 4

DISCUSSION

The results of this study clearly indicate a trend toward effective and efficient resource utilization through saving occupied bed days (OBD) by decreasing the ALOS of those procedures that were admitted according to the new admissions policy. The one exception to this trend is DRG 605, radical prostatectomy, which had a slightly higher ALOS for patients that were admitted through the PAU according to the new policy. This slight inflation in ALOS and the accompanying fluctuation in the trend is probably the result of the small number (4) of cases that were not admitted according to the established procedure. Even if this variance is not the result of the small number of cases, the slight difference of .08 days more for a PAU admission is far outweighed by the decreases in ALOS among patients who underwent one of the other five procedures and were admitted through the new process. The .08 day increase is more than off set by a 2.43 day decrease in ALOS for transurethral prostatectomy within the same surgical service. These findings support the primary hypothesis that the establishment of a new admissions policy has a beneficial impact on resource utilization and management.

While all the findings may not be statistically significant they are managerially significant. It is believed that the lack of statistical significance is probably the result of too many variable interactions, rather than the changes in ALOS being insufficient.

The true importance of the impact of the new admissions process can be seen in the calculation of total OBDs saved. A half a day or a one day decrease in ALOS may not seem like much by itself, but when multiplied by several procedures the resource savings begin to add up. To calculate the OBDs saved, the change in ALOS between the 1993 Non-PAU and PAU study groups is multiplied by the number of procedures that were admitted correctly. This product will be the number of total OBDs saved per surgical procedure. See Figure 24 for a graphical presentation of total OBD savings by procedure.

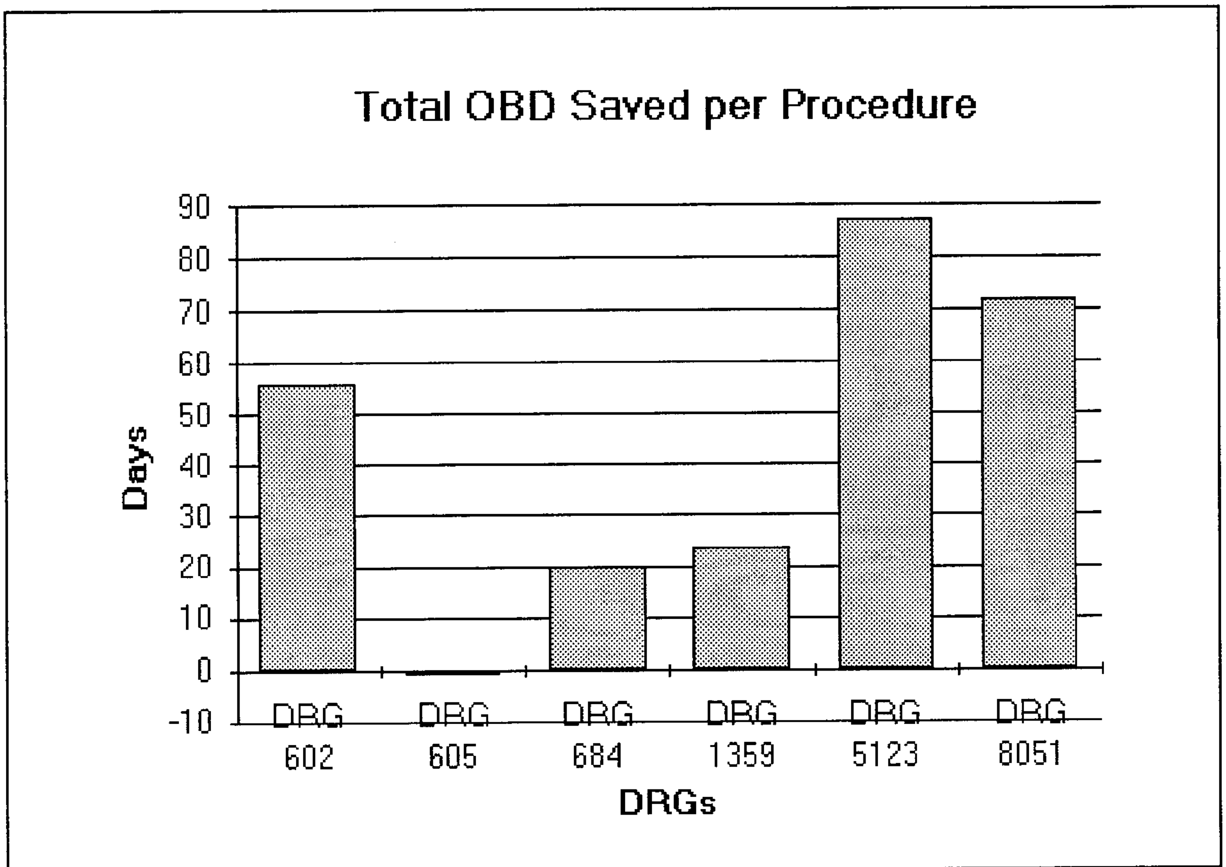

Figure 24 Total OBDs saved per procedure during the time of the study

In the graph, special attention should be paid to DRG 5123 in the General Surgery Service, and DRG 8051 in the Neurosurgery Service. The numbers for OBD savings are high because of the large decrease in ALOS these procedures and services exhibited. The slightly negative number for DRG 605 is due to the slightly elevated ALOS for those patients that were processed through the PAU.

Unfortunately, the amount of resources saved are probably not as high as they could have been. No service exhibited total

compliance with the new admissions procedure, which is to be expected. Compliance rates among the services ranged from 41.38% to 76.67%. Higher compliance rates for all the procedures, except maybe DRG 605, would have resulted in greater savings. See Figure 25 for a graphical presentation of compliance rates by service. While total compliance with the new admissions policy is unrealistic, there is still room for improvement and resource conservation.

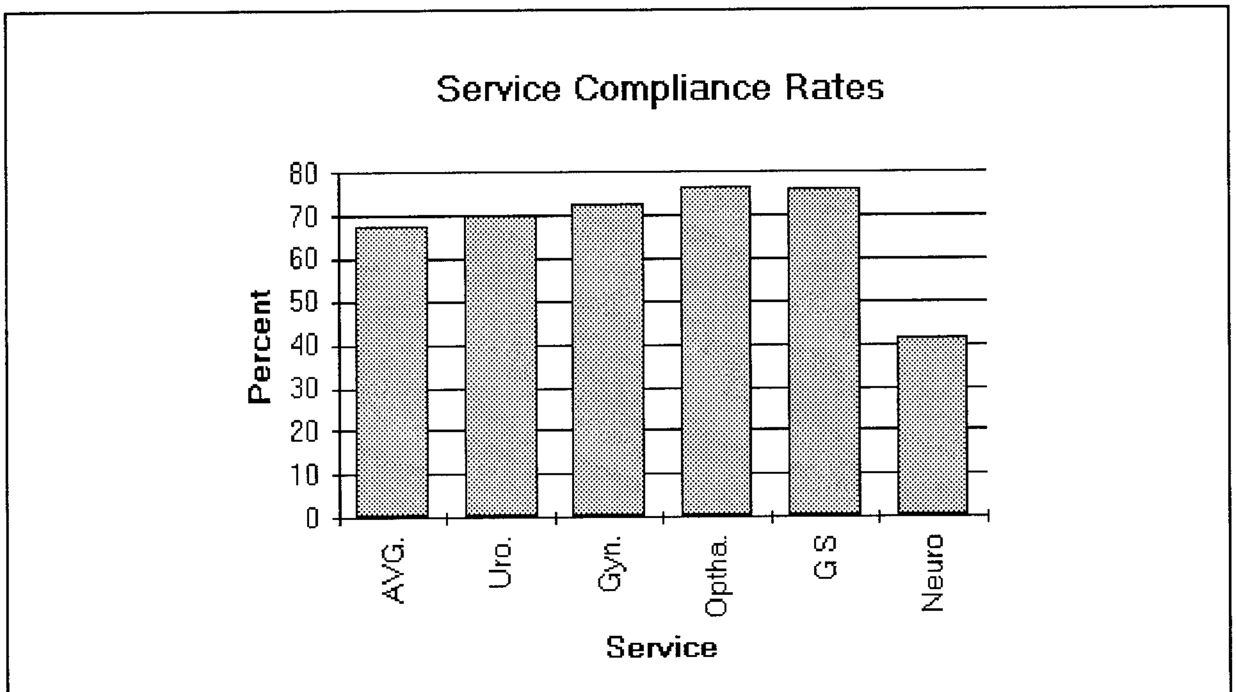

Figure 25 Surgical service compliance rates

Another way of looking at the impact of the new admission process is to calculate the additional OBDs incurred by not following the new admissions policy. This can be calculated by taking the difference in ALOS between the 1993 Non-PAU group and

the 1993 PAU group for each procedure and multiplying it by the number of procedures that did not conform to the new admissions policy to obtain the total additional OBDs incurred per service. The final calculations show that an additional 170.48 OBDs were incurred because of patients not being admitted according to the accepted standardized procedure. See Figure 26 for a graphical presentation of additional OBDs incurred by procedure.

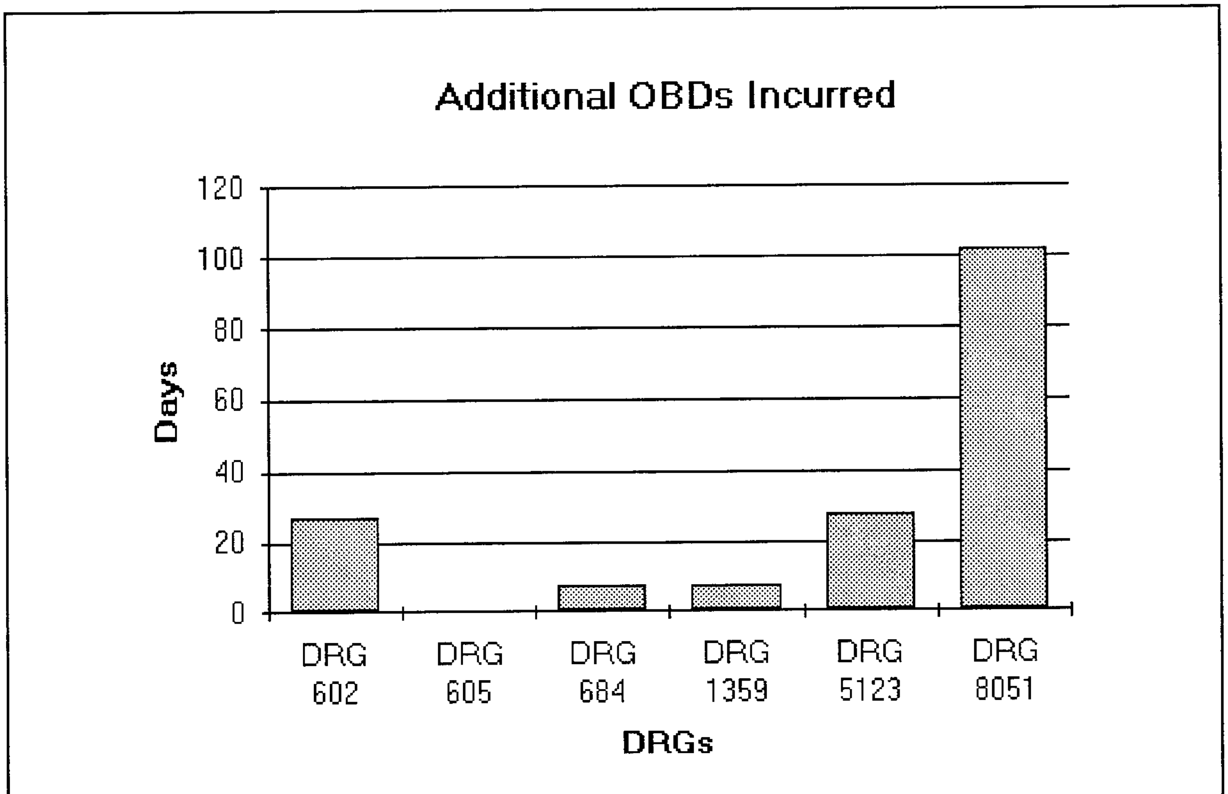

Figure 26 Additional OBDs incurred by procedure for non-compliance with the new admissions process for the five months of the study

Attention should once again be paid to DRG 8051 of the neurosurgery service. Even though, diskectomy had a large

decrease in ALOS, it was also the procedure/service with the lowest compliance rate, which resulted in incurring the largest number of additional OBDs.

Total savings of more than 260 OBDs or incurrance of nearly 170 additional OBDs due to simple compliance with or negligence of a new policy is extremely vital and important to the senior executives of any organization. These figures have even greater impact when they are viewed with the knowledge that they are only a fraction of the total surgeries performed for less than half a year. Total savings or expenses would be expected to be much higher. Potential savings for these six procedures for one year using straight line prediction methods exceeds 619 OBDs, see Figure 27 for a graphical presentation of predicted OBD savings for one year.

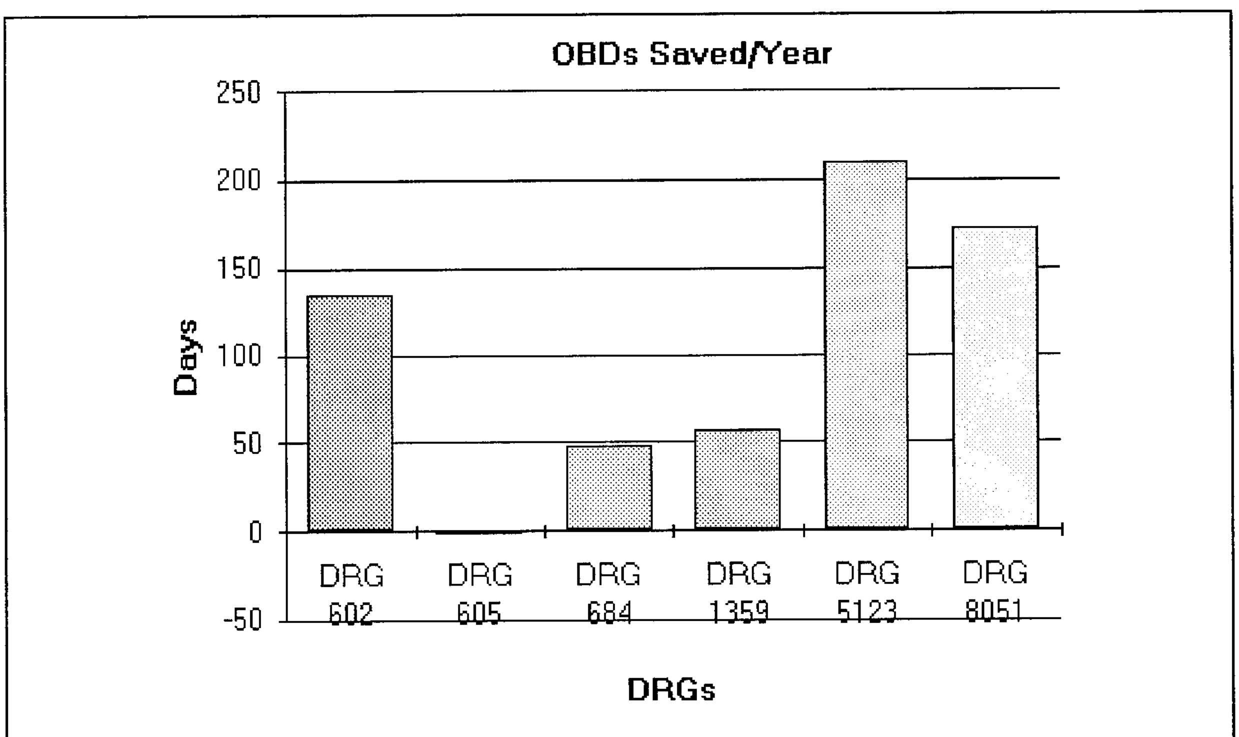

Figure 27 Predicted OBDs saved per year.

Utilizing the same prediction methods, continued failure to follow the new admissions policy could result in the incurrance of more than an additional, yet probably unnecessary, 409 OBDs over a year period. See Figure 28 for a graphical presentation of the potential additionally incurred days.

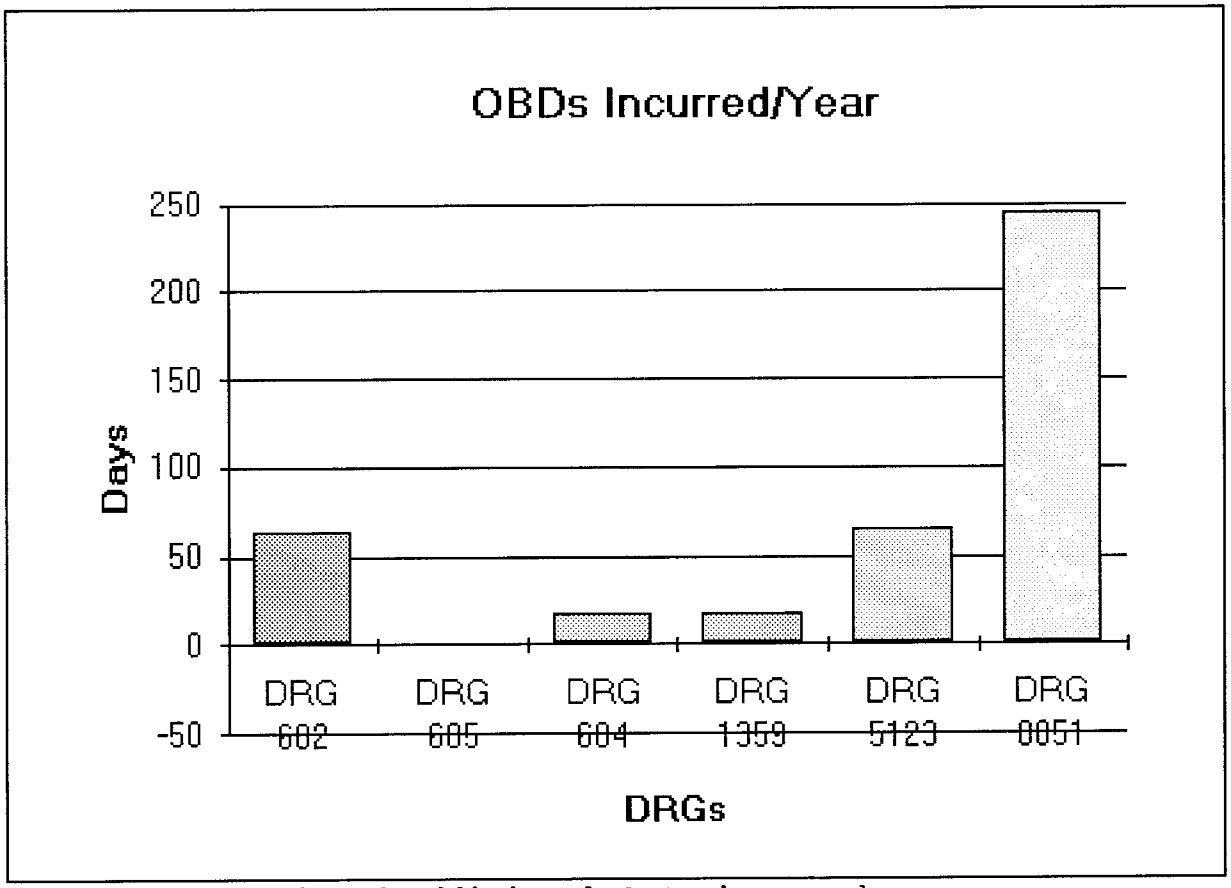

Figure 28 Predicted additional OBDs incurred per year.

While this study did not attempt to measure other benchmarks of success they should be considered. Such benchmarks could include patient satisfaction, physician satisfaction, change in surgical cancellation rates, re-admission rates or increased

revenue from third party insurers due to compliance with pre-authorization policies.

Subjective evaluations based on personal interviews and interactions with patients, physicians and other staff over the past 9 months yield the following observations:

(1) The patients seem to be well satisfied with the new process. Some are irritated that the admissions process takes such a long time, approximately 3-5 hours. But, those patients who have had a previous surgical episode and were admitted under the old process really enjoy the convenience of having to only go to one area instead of being directed all over the hospital. Also, since the new admissions process has decreased the ALOS for most patients, they are discharged sooner, which is generally accepted to be more satisfying to the patient. Overall, patient satisfaction could probably be rated as moderately satisfied or a four or better on a five point scale.

(2) Many physicians have been resistant to adopting the new admissions policy, as evidenced by the compliance rates. The reasons for this resistance have ranged from mistrust of the new system, to desire to personally manage the patient, to lack of communication and education concerning the new process, to alleged difficulties in dealing with the staff of the PAU. Because of these problems the physician satisfaction with the new system could probably be rated somewhere between moderately dissatisfied to moderately satisfied or between two and four on a five point scale.

(3) It is not felt that there has been any appreciable difference in surgical cancellation rates. All attempts to obtain data concerning surgical scheduling and cancellations have met with resistance.

(4) There appears to be no significant increase in re-admissions following surgical discharge. The staff has been fairly evenly divided on their opinions concerning quicker discharges. Some believe that the quality of care may be diminishing because of early discharges, while others believe that consistent patient education prior to admission increases the quality of care and assists the patient in early recovery so they may be discharged sooner.

(5) There appears to be an increase in third party payor collections. It is unclear whether this is due to a new emphasis on billing all possible third party payors, or because of a better compliance rate with pre-authorization policies.

CHAPTER 5

RECOMMENDATIONS AND CONCLUSION

Both objective data obtained through accepted research and statistical methods and subjective observations obtained through personal interviews, clearly indicate that the implementation of the new admissions process was a wise management decision. This principle should continue to be explored and expanded to further realize additional benefits through sound utilization management principles.

Recommendations to enhance the benefits of the new admissions process include emphasizing better communication between the PAU staff and the admitting physicians, extend the hours of operation of the unit, and stress the importance of customer oriented business practices. Communications can be enhanced through re-establishment of the Surgical Quality Management Group (QMG) to gain additional input from a multi-disciplinary group. The establishment and impending implementation of the Surgical Information System, which will allow easier access to surgical schedules, should also encourage better communication between the concerned parties. The Head Nurse should also consider hosting a Grand Round or educational program for all the service chiefs and senior residents.

The hours of unit operation should be extended to match those of Tripler Army Medical Center in Hawaii. Tripler's hours of operation are from 0530 to 2200 hours Monday through Friday. Tripler increased their hours of operation after receiving input from the physician staff that they would like to send patients to the PAU in the early evening. This would also allow people to come in after work for their pre-admission work-up so they would not have to miss an additional day of work or arrange for daycare. This should also lend itself to increasing patient satisfaction as well as increasing physician satisfaction by focusing on customer oriented business practices (Stakk, 1994).

Customer oriented business practices are those practices that are most beneficial to the PAU's two most important customers, patients and physicians. These customers may make suggestions that could include a change in appointment scheduling, change in operational hours, additions or deletions of some stations, or any other sensible idea. This process may also be enhanced by the re-establishment of the Admissions QMG.

The results of this study are not generalizable to other medical centers in other regions, but the research template may be adapted and modified for further use. Further research in the area of resource utilization benefits of Pre-Admission Units and changes in admission procedures should be conducted. Further research topics could include an analysis of the quality of care provided before and after establishment of a new admissions policy, analysis of third party reimbursements, time studies and

analysis of each step of the admissions process, analysis of establishing clinical pathways for admission, or analysis of impacts of a new admissions process on surgical cancellations and related logistical savings. A further detailed analysis of the types of patients who receive surgery may also be conducted to confirm that the decision to perform surgery is not based on any type of inherent prejudice or bias.

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APPENDIX A

Results of Demographic Analysis

ANALYSIS OF GENDER STUDY GROUPS

Summary Table for Gender, Study Groups

Num. Missing	0
DF	2
Chi Square	2.108
Chi Square P-Value	.3486
G-Squared	2.112
G-Squared P-Value	.3479
Contingency Coef.	.064
Cramer's V	.064

Observed Frequencies for Gender, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
F	141	35	81	257
M	146	45	70	261
Totals	287	80	151	518

Percents of Row Totals for Gender, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
F	54.864	13.619	31.518	100.000
M	55.939	17.241	26.820	100.000
Totals	55.405	15.444	29.151	100.000

Percents of Column Totals for Gender, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
F	49.129	43.750	53.642	49.614
M	50.871	56.250	46.358	50.386
Totals	100.000	100.000	100.000	100.000

F = Female
M = Male

ANALYSIS OF RACE STUDY GROUPS

Summary Table for Race, Study Groups

Num. Missing	0
DF	6
Chi Square	6.695
Chi Square P-Value	.3500
G-Squared	7.012
G-Squared P-Value	.3197
Contingency Coef.	.113
Cramer's V	.080

Observed Frequencies for Race, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
A	12	2	7	21
C	235	71	121	427
H	12	4	12	28
N	28	3	11	42
Totals	287	80	151	518

Percents of Row Totals for Race, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
A	57.143	9.524	33.333	100.000
C	55.035	16.628	28.337	100.000
H	42.857	14.286	42.857	100.000
N	66.667	7.143	26.190	100.000
Totals	55.405	15.444	29.151	100.000

Percents of Column Totals for Race, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
A	4.181	2.500	4.636	4.054
C	81.882	88.750	80.132	82.432
H	4.181	5.000	7.947	5.405
N	9.756	3.750	7.285	8.108
Totals	100.000	100.000	100.000	100.000

A = Asiatic
C = Caucasian
H = Hispanic
N = Negroid

ANALYSIS OF SERVICE STUDY GROUPS

Summary Table for Service, Study Groups

Num. Missing	0
DF	8
Chi Square	4.774
Chi Square P-Value	.7815
G-Squared	•
G-Squared P-Value	•
Contingency Coef.	.096
Cramer's V	.066

Observed Frequencies for Service, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
A	179	43	86	308
AF	65	22	42	129
CG	7	3	2	12
M	2	0	1	3
N	34	12	20	66
Totals	287	80	151	518

Percents of Row Totals for Service, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
A	58.117	13.961	27.922	100.000
AF	50.388	17.054	32.558	100.000
CG	58.333	25.000	16.667	100.000
M	66.667	0.000	33.333	100.000
N	51.515	18.182	30.303	100.000
Totals	55.405	15.444	29.151	100.000

Percents of Column Totals for Service, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
A	62.369	53.750	56.954	59.459
AF	22.648	27.500	27.815	24.903
CG	2.439	3.750	1.325	2.317
M	0.697	0.000	0.662	0.579
N	11.847	15.000	13.245	12.741
Totals	100.000	100.000	100.000	100.000

A = Army
AF = Air Force
CG = Coast Guard
M = Marine Corps
N = Navy

ANALYSIS OF STATUS STUDY GROUPS

Summary Table for Status, Study Groups

Num. Missing	0
DF	6
Chi Square	3.484
Chi Square P-Value	.7461
G-Squared	3.601
G-Squared P-Value	.7305
Contingency Coef.	.082
Cramer's V	.058

Observed Frequencies for Status, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
AD	59	19	25	103
Dep AD	11	3	[illegible]	17
DEP R	120	32	71	223
RET	97	26	52	175
Totals	287	80	151	518

Percents of Row Totals for Status, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
AD	57.282	18.447	24.272	100.000
Dep AD	64.706	17.647	17.647	100.000
DEP R	53.812	14.350	31.839	100.000
RET	55.429	14.857	29.714	100.000
Totals	55.405	15.444	29.151	100.000

Percents of Column Totals for Status, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
AD	20.557	23.750	16.556	19.884
Dep AD	3.833	3.750	1.987	3.282
DEP R	41.812	40.000	47.020	43.050
RET	33.798	32.500	34.437	33.784
Totals	100.000	100.000	100.000	100.000

```
AD     = Active Duty
Dep AD = Dependent of Active Duty
Dep R  = Dependent of Retiree
R      = Retired
```

ANALYSIS OF DRG STUDY GROUPS

Summary Table for DRG, Study Groups

Num. Missing	0
DF	10
Chi Square	23.080
Chi Square P-Value	.0105
G-Squared	21.648
G-Squared P-Value	.0159
Contingency Coef.	.207
Cramer's V	.149

Observed Frequencies for DRG, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
602	38	11	23	72
605	17	4	12	33
684	76	14	37	127
1359	34	7	23	64
5123	56	10	32	98
8051	66	34	24	124
Totals	287	80	151	516

Percents of Row Totals for DRG, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
602	52.778	15.278	31.944	100.000
605	51.515	12.121	36.364	100.000
684	59.843	11.024	29.134	100.000
1359	53.125	10.938	35.938	100.000
5123	57.143	10.204	32.653	100.000
8051	53.226	27.419	19.355	100.000
Totals	55.405	15.444	29.151	100.000

Percents of Column Totals for DRG, Study Groups

	92 non-PAU	93 non-PAU	93 PAU	Totals
602	13.240	13.750	15.232	13.900
605	5.923	5.000	7.947	6.371
684	26.481	17.500	24.503	24.517
1359	11.847	8.750	15.232	12.355
5123	19.512	12.500	21.192	18.919
8051	22.997	42.500	15.894	23.938
Totals	100.000	100.000	100.000	100.000

602 = Transurethral Prostatectomy
605 = Radical Prostatectomy
684 = Total Abdominal Hysterectomy
1359 = Lens Extraction
5123 = Laparoscopic Cholecystectomy
8051 = Diskectomy

APPENDIX B

Resusults of Age Analysis

AGE EFFECTS OF PAU

ANOVA Table for Age

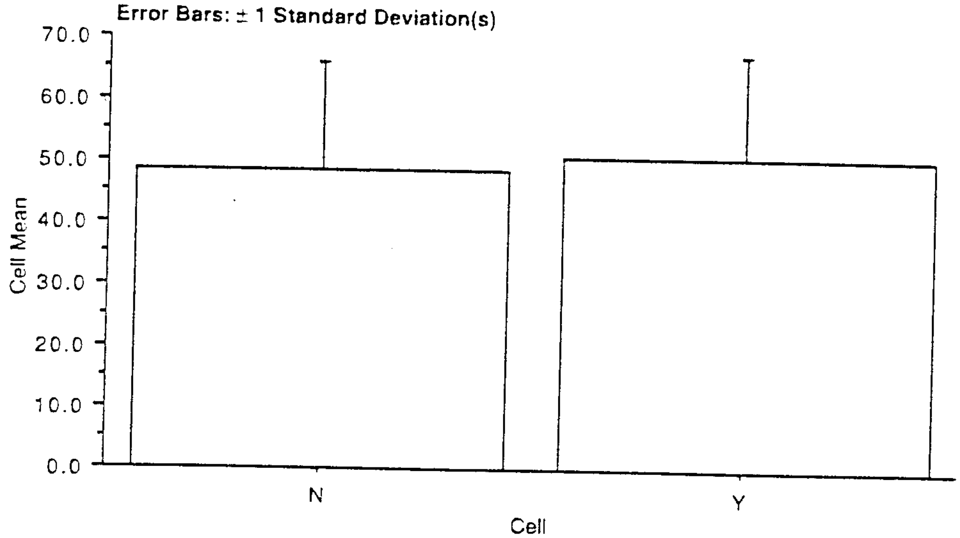
	DF	Sum of Squares	Mean Square	F-Value	P-Value
PAU	1	11.193	11.193	0.078	0.7796
DRG	5	69379.111	13875.822	97.186	<0.0001
PAU * DRG	5	818.059	163.612	1.146	0.3350
Residual	506	72244.760	142.776		

Means Table for Age
Effect: PAU

	Count	Mean	Std. Dev.	Std. Err.
N	367	48.627	17.411	0.909
Y	151	50.715	16.796	1.367

N = Did not process through the PAU
Y = Did process through PAU

Interaction Bar Plot for Age
Effect: PAU
Error Bars: ± 1 Standard Deviation(s)



AGE EFFECTS OF DRG

Means Table for Age
Effect: DRG

	Count	Mean	Std. Dev.	Std. Err.
602	72	69.042	7.510	0.885
605	33	65.394	5.825	1.014
684	127	42.394	10.528	0.934
1359	64	65.531	13.228	1.654
5123	98	41.071	16.194	1.636
8051	124	38.484	11.946	1.073

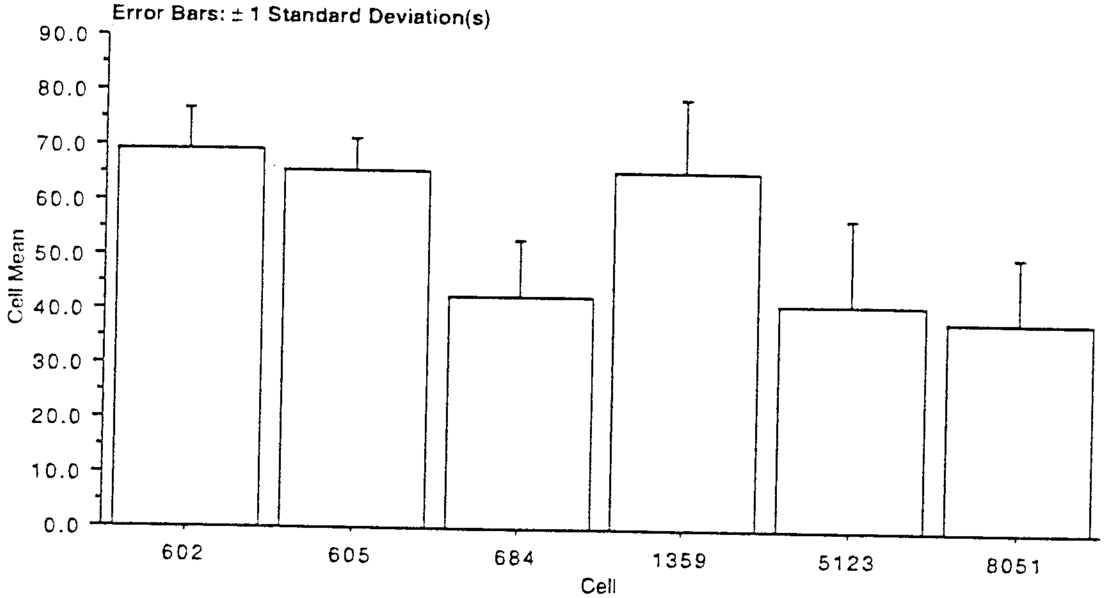
602 = Transurethral Prostatectomy
605 = Radical Prostatectomy
684 = Total Abdominal Hysterectomy
1359 = Lens Extraction
5123 = Laparoscopic Cholecystectomy
8051 = Diskectomy

AGE EFFECTS OF PAU AND DRG

Means Table for Age
Effect: PAU * DRG

	Count	Mean	Std. Dev.	Std. Err.
N, 602	49	69.816	8.015	1.145
N, 605	21	66.143	4.993	1.090
N, 684	90	42.200	10.558	1.113
N, 1359	41	63.585	15.271	2.385
N, 5123	66	41.091	16.837	2.072
N, 8051	100	39.190	12.597	1.260
Y, 602	23	67.391	6.140	1.280
Y, 605	12	64.083	7.103	2.050
Y, 684	37	42.865	10.586	1.740
Y, 1359	23	69.000	7.580	1.581
Y, 5123	32	41.031	15.039	2.658
Y, 8051	24	35.542	8.304	1.695

Interaction Bar Plot for Age
Effect: DRG
Error Bars: ± 1 Standard Deviation(s)



602 = Transurethral Prostatectomy
605 = Radical Prostatectomy
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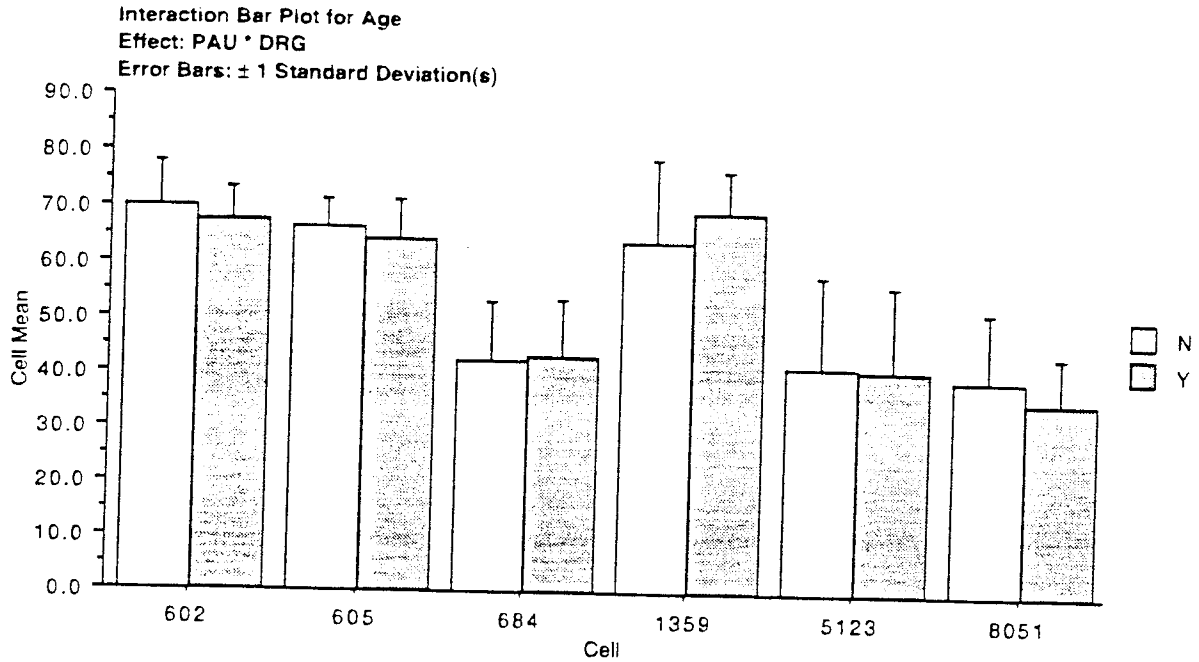
8051 = Diskectomy

APPENDIX B-2

AGE EFFECTS OF PAU AND DRG



602 = Transurethral Prostatectomy
605 = Radical Prostatectomy
684 = Total Abdominal Hysterectomy
1359 = Lens Extraction
5123 = Laparoscopic Cholecystectomy
8051 = Diskectomy

AGE EFFECTS OF STUDY GROUPS AND DRG

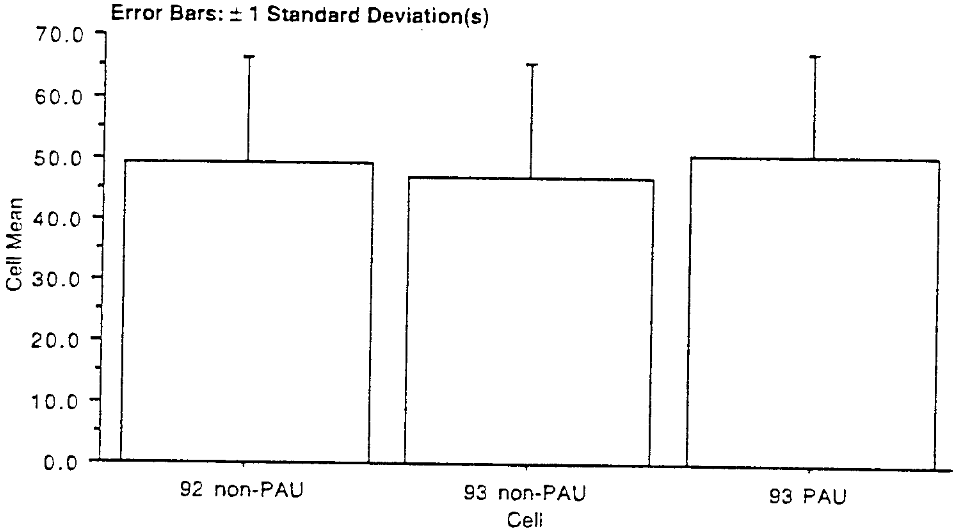
ANOVA Table for Age

	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	48.986	24.493	0.171	0.8427
DRG	5	60891.098	12178.220	85.095	<0.0001
Study Groups * DRG	10	1479.779	147.978	1.034	0.4132
Residual	500	71556.462	143.113		

Means Table for Age
Effect: Study Groups

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	287	49.087	17.099	1.009
93 non-PAU	80	46.975	18.506	2.069
93 PAU	151	50.715	16.796	1.367

Interaction Bar Plot for Age
Effect: Study Groups
Error Bars: ± 1 Standard Deviation(s)



Means Table for Age
Effect: DRG

	Count	Mean	Std. Dev.	Std. Err.
602	72	69.042	7.510	0.885
605	33	65.394	5.825	1.014
684	127	42.394	10.528	0.934
1359	64	65.531	13.228	1.654
5123	98	41.071	16.194	1.636
8051	124	38.484	11.946	1.073

602 = Transurethral Prostatectomy
605 = Radical Prostatectomy
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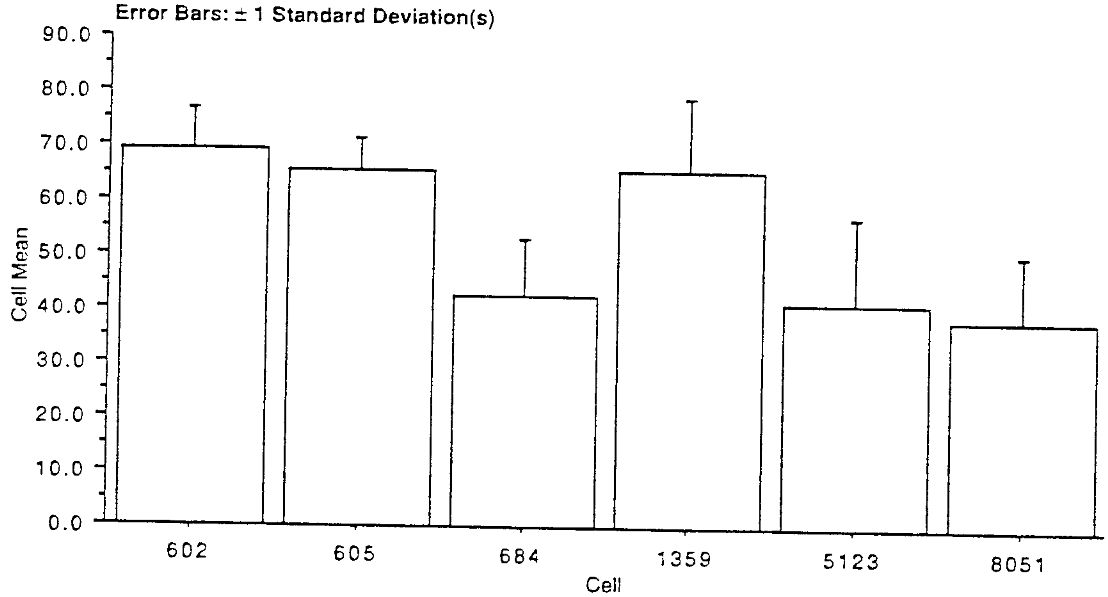
8051 = Diskectomy

AGE EFFECTS OF STUDY GROUPS AND DRG

Means Table for Age
Effect: Study Groups * DRG

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU, 602	38	69.553	8.100	1.314
92 non-PAU, 605	17	65.765	4.956	1.202
92 non-PAU, 684	76	41.724	9.676	1.110
92 non-PAU, 1359	34	64.206	12.605	2.162
92 non-PAU, 5123	56	42.196	17.128	2.289
92 non-PAU, 8051	66	39.545	13.123	1.615
93 non-PAU, 602	11	70.727	8.026	2.420
93 non-PAU, 605	4	67.750	5.560	2.780
93 non-PAU, 684	14	44.786	14.645	3.914
93 non-PAU, 1359	7	60.571	25.845	9.768
93 non-PAU, 5123	10	34.900	14.294	4.520
93 non-PAU, 8051	34	38.500	11.665	2.001
93 PAU, 602	23	67.391	6.140	1.280
93 PAU, 605	12	64.083	7.103	2.050
93 PAU, 684	37	42.865	10.586	1.740
93 PAU, 1359	23	69.000	7.580	1.581
93 PAU, 5123	32	41.031	15.039	2.658
93 PAU, 8051	24	35.542	8.304	1.695

Interaction Bar Plot for Age
Effect: DRG
Error Bars: ± 1 Standard Deviation(s)



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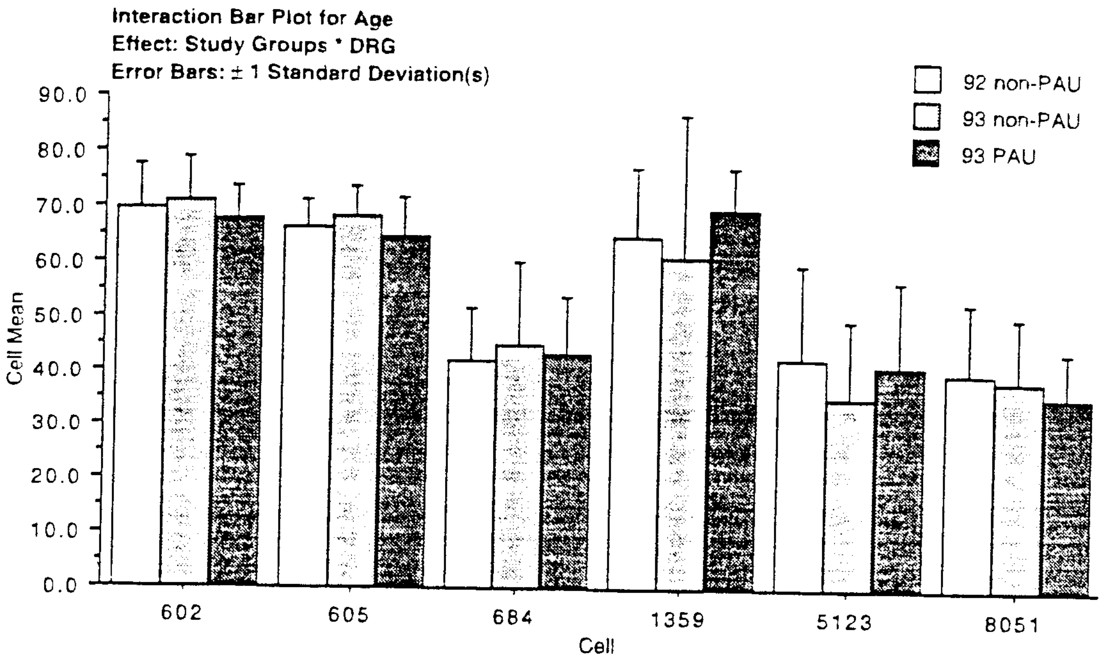
AGE EFFECTS OF STUDY GROUPS AND DRG



602 = Transurethral Prostatectomy
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ANALYSIS OF AGE DIFFERENCES OF STUDY GROUPS

ANOVA Table for Age

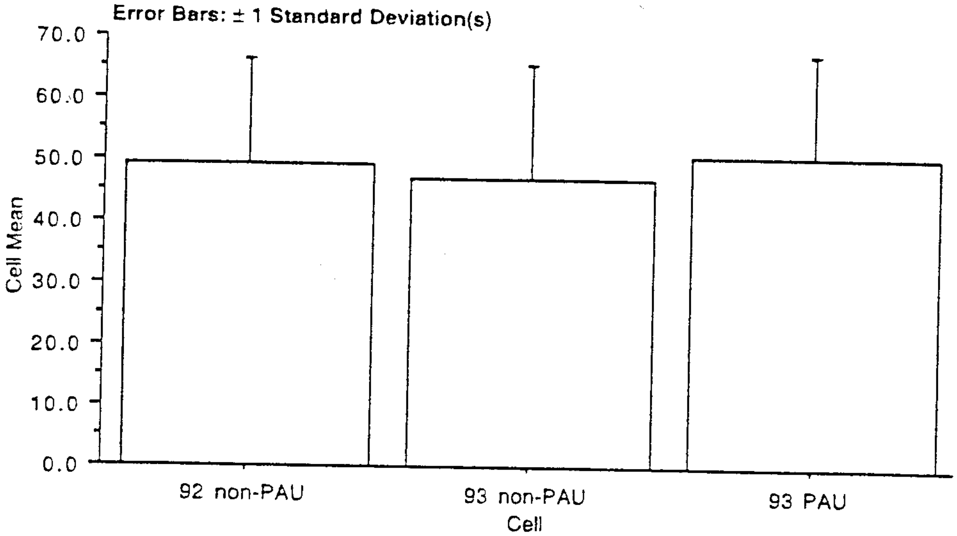
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	745.739	372.870	1.255	0.2859
Residual	515	152991.527	297.071		

Model II estimate of between component variance: 0.501

Means Table for Age
Effect: Study Groups

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	287	49.087	17.099	1.009
93 non-PAU	80	46.975	18.506	2.069
93 PAU	151	50.715	16.796	1.367

Interaction Bar Plot for Age
Effect: Study Groups
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for Age
Effect: Study Groups
Significance Level: 5 %

	Mean Diff.	Crit. Diff	P-Value
92 non-PAU, 93 non-PAU	2.112	4.281	0.3329
92 non-PAU, 93 PAU	-1.628	3.404	0.3479
93 non-PAU, 93 PAU	-3.740	4.682	0.1172

ANALYSIS OF AGE TRANSURETHRAL PROSTATECTOMY STUDY GROUPS

ANOVA Table for Age
Split By: DRG
Cell: 602

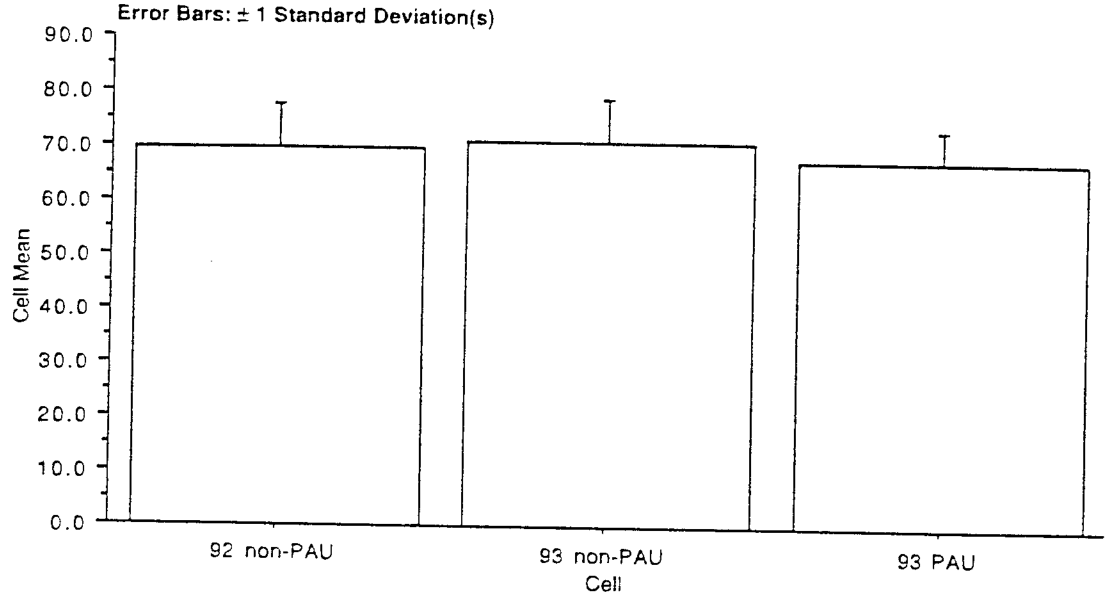
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	103.820	51.910	0.918	0.4041
Residual	69	3901.055	56.537		

Model II estimate of between component variance: •

Means Table for Age
Effect: Study Groups
Split By: DRG
Cell: 602

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	38	69.553	8.100	1.314
93 non-PAU	11	70.727	8.026	2.420
93 PAU	23	67.391	6.140	1.280

Interaction Bar Plot for Age
Effect: Study Groups
Split By: DRG
Cell: 602
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for Age
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 602

	Mean Diff.	Crit. Diff	P-Value
92 non-PAU, 93 non-PAU	-1.175	5.136	0.6496
92 non-PAU, 93 PAU	2.161	3.963	0.2804
93 non-PAU, 93 PAU	3.336	5.499	0.2303

ANALYSIS OF AGE OF RADICAL PROSTATECTOMY STUDY GROUPS

ANOVA Table for Age
Split By: DRG
Cell: 605

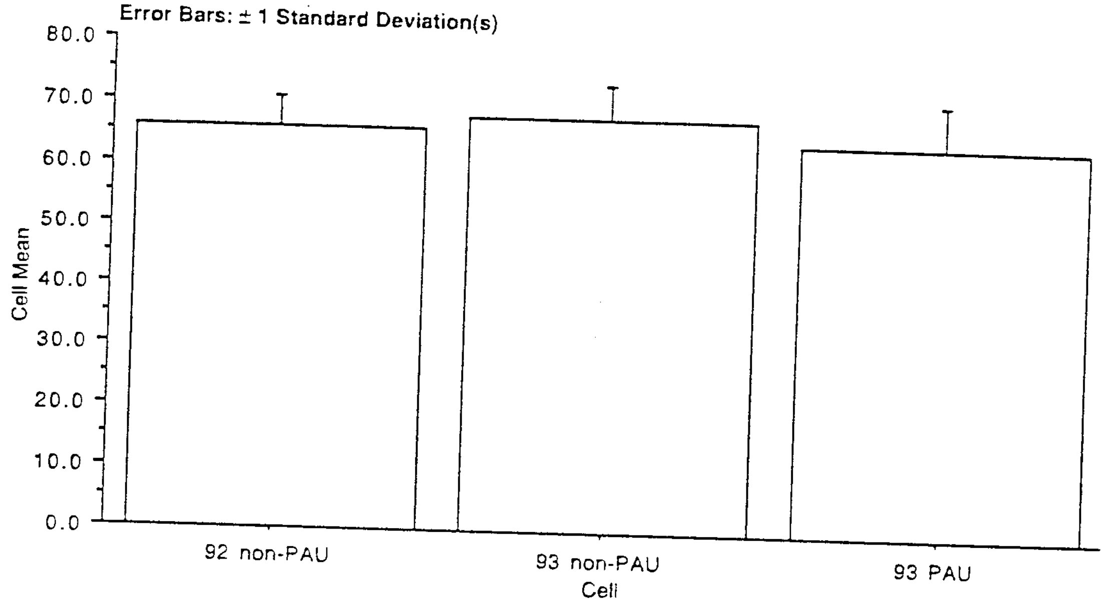
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	45.153	22.577	0.651	0.5288
Residual	30	1040.725	34.691		

Model II estimate of between component variance: •

Means Table for Age
Effect: Study Groups
Split By: DRG
Cell: 605

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	17	65.765	4.956	1.202
93 non-PAU	4	67.750	5.560	2.780
93 PAU	12	64.083	7.103	2.050

Interaction Bar Plot for Age
Effect: Study Groups
Split By: DRG
Cell: 605
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for Age
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 605

	Mean Diff.	Crit. Diff	P-Value
92 non-PAU, 93 non-PAU	-1.985	6.685	0.5487
92 non-PAU, 93 PAU	1.681	4.535	0.4549
93 non-PAU, 93 PAU	3.667	6.945	0.2895

ANALYSIS OF AGE OF TOTAL ABDOMINAL HYSTERECTOMY STUDY GROUPS

ANOVA Table for Age
Split By: DRG
Cell: 684

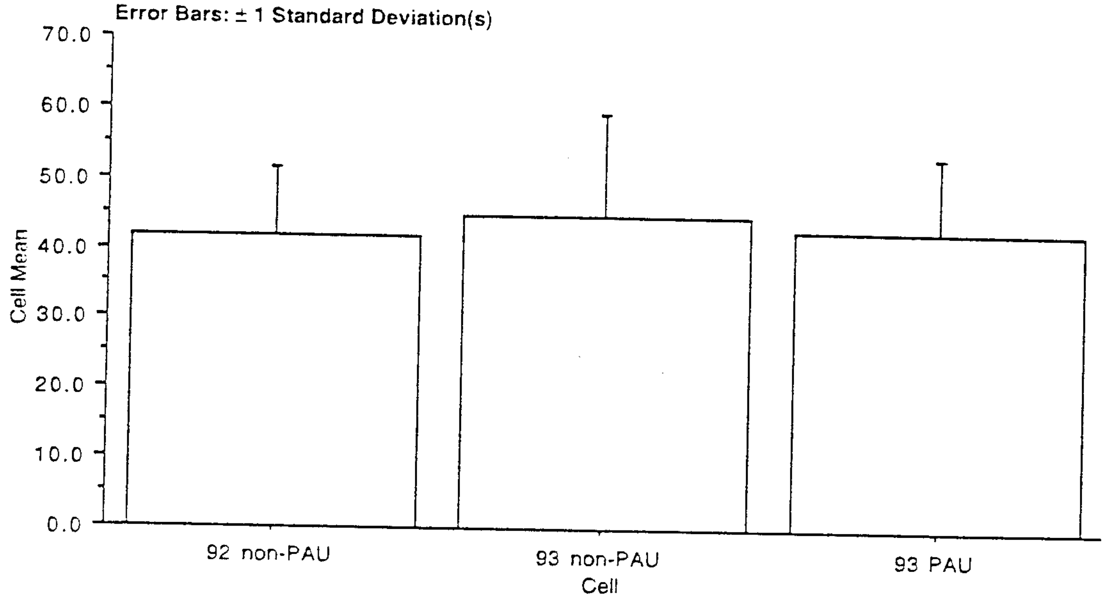
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	122.436	61.218	0.548	0.5793
Residual	124	13843.879	111.644		

Model II estimate of between component variance: •

Means Table for Age
Effect: Study Groups
Split By: DRG
Cell: 684

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	76	41.724	9.676	1.110
93 non-PAU	14	44.786	14.645	3.914
93 PAU	37	42.865	10.586	1.740

Interaction Bar Plot for Age
Effect: Study Groups
Split By: DRG
Cell: 684
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for Age
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 684

	Mean Diff.	Crit. Diff	P-Value
92 non-PAU, 93 non-PAU	-3.062	6.082	0.3210
92 non-PAU, 93 PAU	-1.141	4.192	0.5910
93 non-PAU, 93 PAU	1.921	6.562	0.5634

ANALYSIS OF AGE OF LENS EXTRACTION STUDY GROUPS

ANOVA Table for Age
Split By: DRG
Cell: 1359

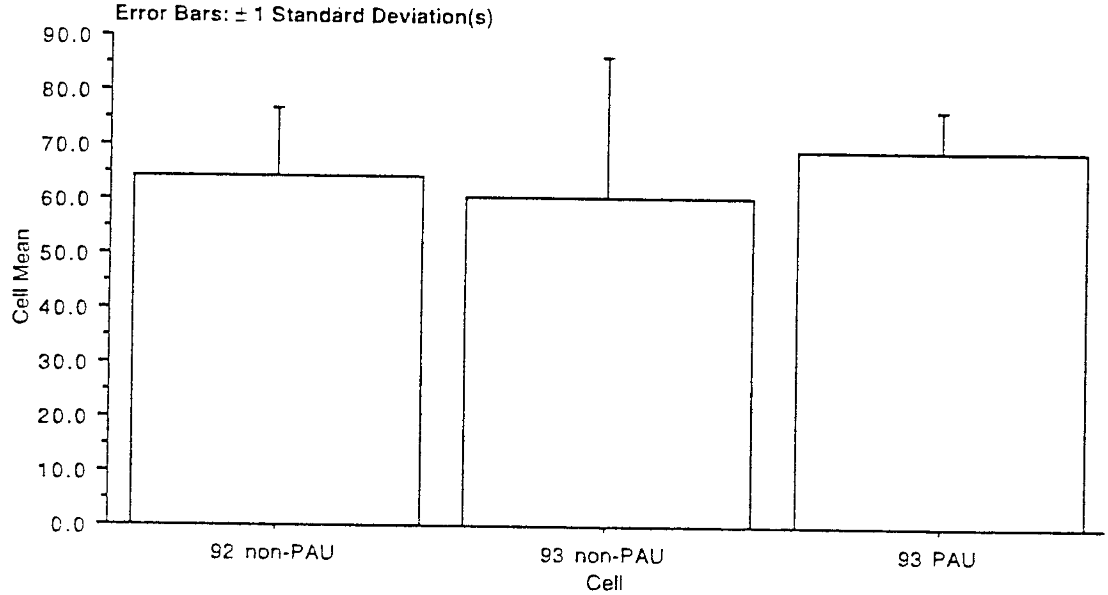
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	508.664	254.332	1.475	0.2367
Residual	61	10515.273	172.382		

Model II estimate of between component variance: 4.441

Means Table for Age
Effect: Study Groups
Split By: DRG
Cell: 1359

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	34	64.206	12.605	2.162
93 non-PAU	7	60.571	25.845	9.768
93 PAU	23	69.000	7.580	1.581

Interaction Bar Plot for Age
Effect: Study Groups
Split By: DRG
Cell: 1359
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for Age
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 1359

	Mean Diff.	Crit. Diff	P-Value
92 non-PAU, 93 non-PAU	3.634	10.897	0.5073
92 non-PAU, 93 PAU	-4.794	7.088	0.1812
93 non-PAU, 93 PAU	-8.429	11.333	0.1421

ANALYSIS OF AGE OF LAPAROSCOPIC CHOLECYSTECTOMY STUDY GROUPS

ANOVA Table for Age
Split By: DRG
Cell: 5123

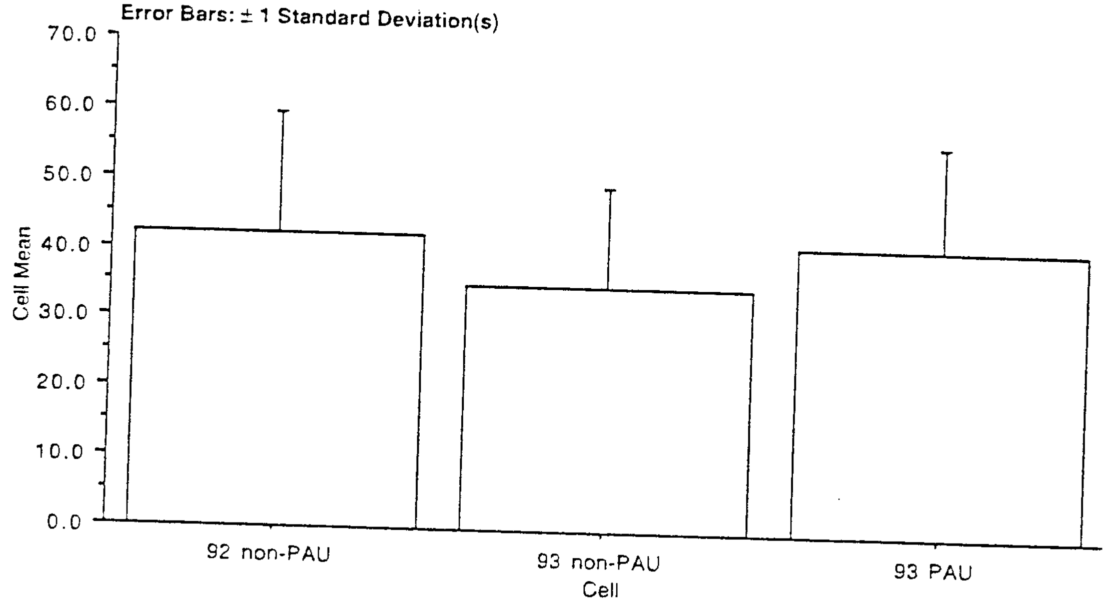
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	451.792	225.896	0.859	0.4269
Residual	95	24984.708	262.997		

Model II estimate of between component variance: •

Means Table for Age
Effect: Study Groups
Split By: DRG
Cell: 5123

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	56	42.196	17.128	2.289
93 non-PAU	10	34.900	14.294	4.520
93 PAU	32	41.031	15.039	2.658

Interaction Bar Plot for Age
Effect: Study Groups
Split By: DRG
Cell: 5123
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for Age
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 5123

	Mean Diff.	Crit. Diff	P-Value
92 non-PAU, 93 non-PAU	7.296	11.053	0.1932
92 non-PAU, 93 PAU	1.165	7.134	0.7465
93 non-PAU, 93 PAU	-6.131	11.664	0.2993

ANALYSIS OF AGE OF DISKECTOMY STUDY GROUPS

ANOVA Table for Age
Split By: DRG
Cell: 8051

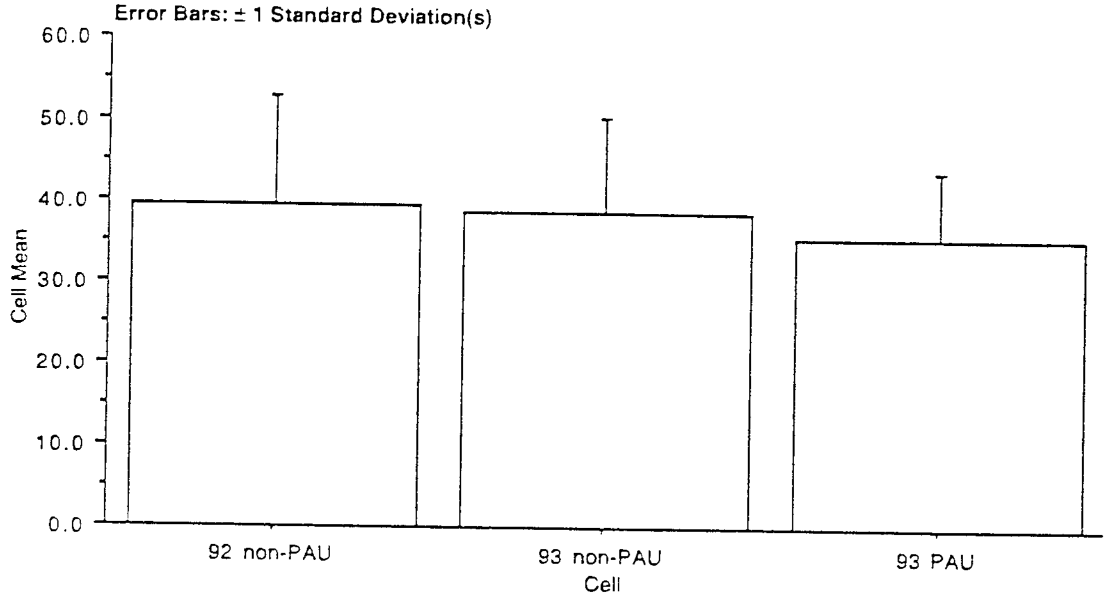
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	282.146	141.073	0.988	0.3752
Residual	121	17270.822	142.734		

Model II estimate of between component variance: •

Means Table for Age
Effect: Study Groups
Split By: DRG
Cell: 8051

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	66	39.545	13.123	1.615
93 non-PAU	34	38.500	11.665	2.001
93 PAU	24	35.542	8.304	1.695

Interaction Bar Plot for Age
Effect: Study Groups
Split By: DRG
Cell: 8051
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for Age
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 8051

	Mean Diff.	Crit. Diff	P-Value
92 non-PAU, 93 non-PAU	1.045	4.993	0.6792
92 non-PAU, 93 PAU	4.004	5.638	0.1623
93 non-PAU, 93 PAU	2.958	6.306	0.3549

APPENDIX C

Variable Effects on LOS

ANALYSIS OF STUDY GROUPS EFFECTS ON LOS

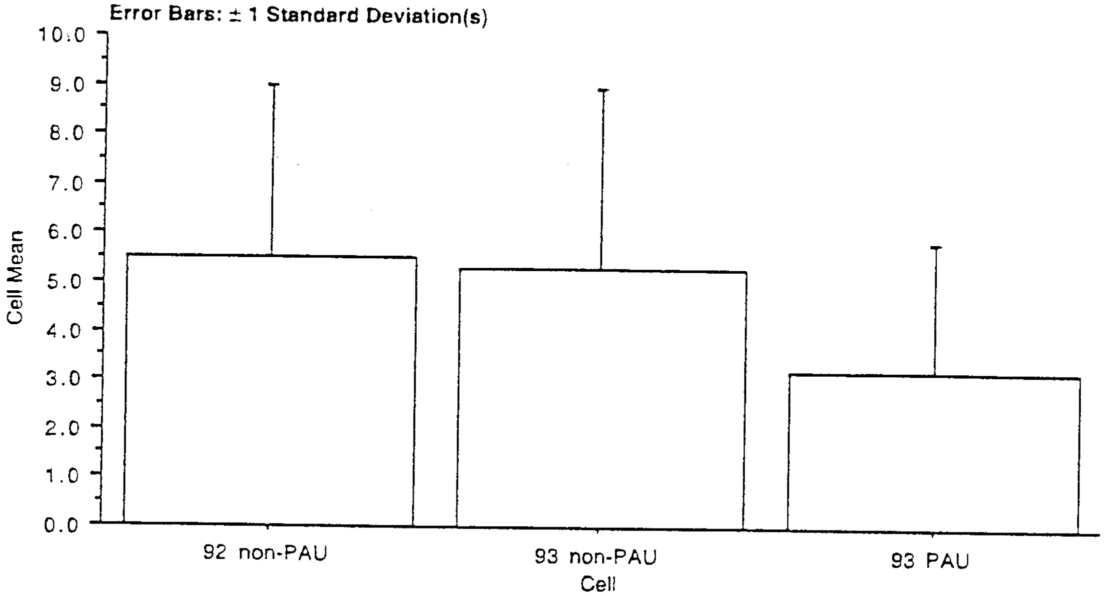
ANOVA Table for LOS

	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	350.864	175.432	20.995	<0.0001
DRG	5	744.521	148.904	17.820	<0.0001
Study Groups * DRG	10	124.729	12.473	1.493	0.1386
Residual	500	4178.038	8.356		

Means Table for LOS
Effect: Study Groups

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	287	5.495	3.470	0.205
93 non-PAU	80	5.275	3.659	0.409
93 PAU	151	3.192	2.637	0.215

Interaction Bar Plot for LOS
Effect: Study Groups
Error Bars: ± 1 Standard Deviation(s)



DRG EFFECTS ON LOS

Means Table for LOS
Effect: DRG

	Count	Mean	Std. Dev.	Std. Err.
602	72	4.097	2.623	0.309
605	33	7.606	1.619	0.282
684	127	6.102	3.179	0.282
1359	64	1.766	1.151	0.144
5123	98	3.592	3.771	0.381
8051	124	5.605	3.445	0.309

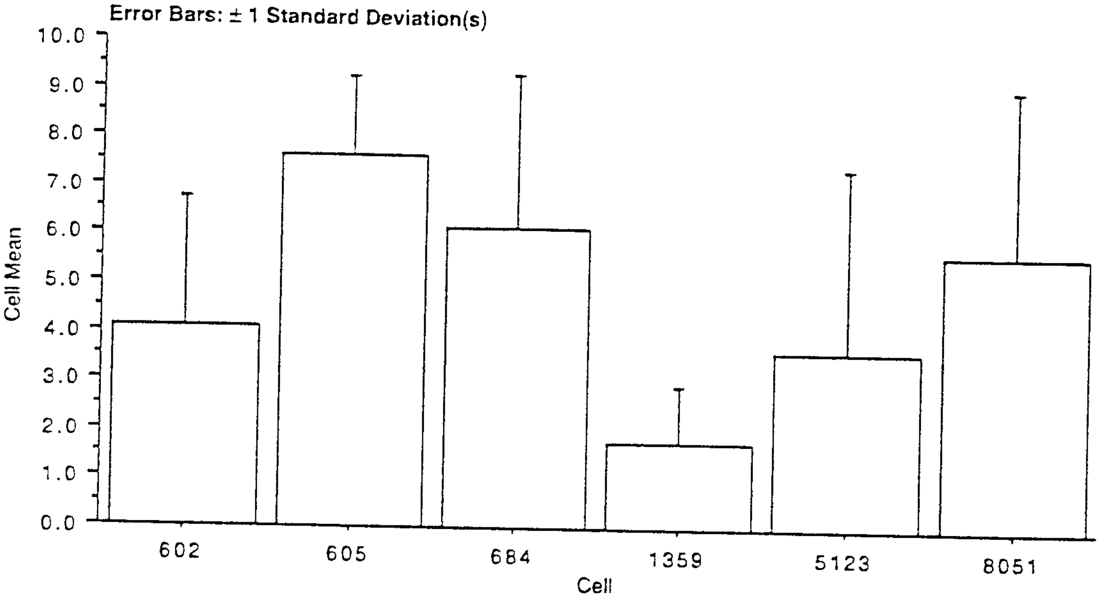
602 = Transurethral Prostatectomy
605 = Radical Prostatectomy
684 = Total Abdominal Hysterectomy
1359 = Lens Extraction
5123 = Laparoscopic Cholecystectomy
8051 = Diskectomy

EFFECTS OF DRG AND STUDY GROUPS ON LOS

Means Table for LOS
Effect: Study Groups * DRG

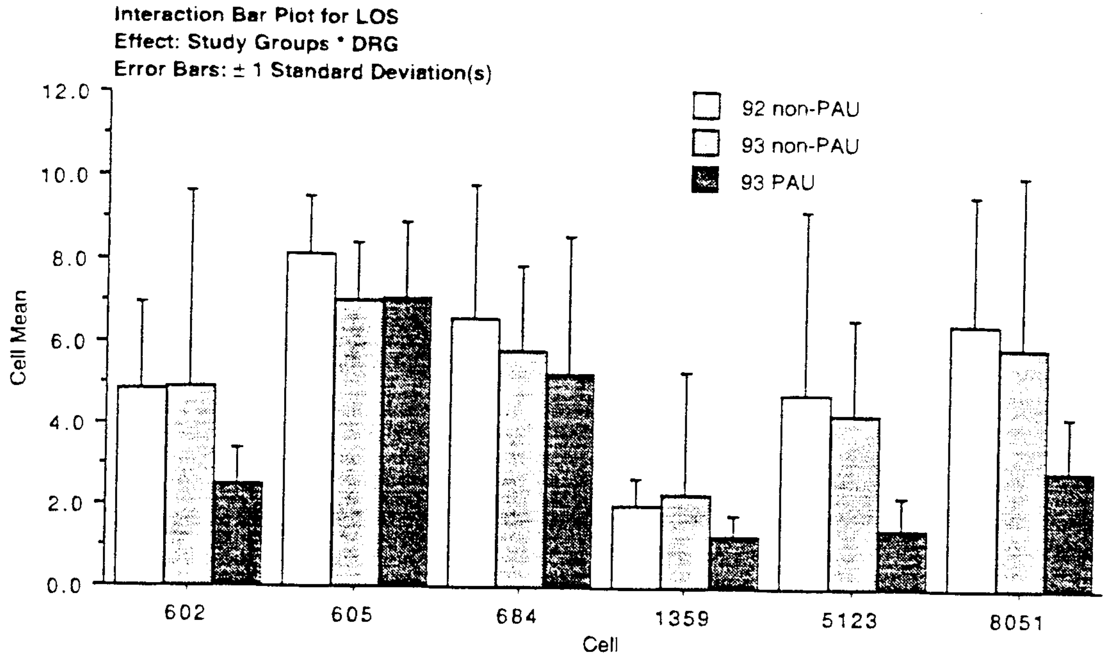
	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU, 602	38	4.842	2.099	0.341
92 non-PAU, 605	17	8.118	1.409	0.342
92 non-PAU, 684	76	6.579	3.226	0.370
92 non-PAU, 1359	34	2.000	0.651	0.112
92 non-PAU, 5123	56	4.696	4.464	0.596
92 non-PAU, 8051	66	6.424	3.109	0.383
93 non-PAU, 602	11	4.909	4.679	1.411
93 non-PAU, 605	4	7.000	1.414	0.707
93 non-PAU, 684	14	5.786	2.045	0.547
93 non-PAU, 1359	7	2.286	2.984	1.128
93 non-PAU, 5123	10	4.200	2.348	0.742
93 non-PAU, 8051	34	5.912	4.159	0.713
93 PAU, 602	23	2.478	0.898	0.187
93 PAU, 605	12	7.083	1.832	0.529
93 PAU, 684	37	5.243	3.303	0.543
93 PAU, 1359	23	1.261	0.541	0.113
93 PAU, 5123	32	1.469	0.761	0.135
93 PAU, 8051	24	2.917	1.316	0.269

Interaction Bar Plot for LOS
Effect: DRG
Error Bars: ± 1 Standard Deviation(s)



APPENDIX C-2

EFFECTS OF DRG AND STUDY GROUPS ON LOS



602 = Transurethral Prostatectomy
605 = Radical Prostatectomy
684 = Total Abdominal Hysterectomy
1359 = Lens Extraction
5123 = Laparoscopic Cholecystectomy
8051 = Diskectomy

EFFECTS OF PAU AND DRG (SEPARATE AND COMBINED) ON LOS

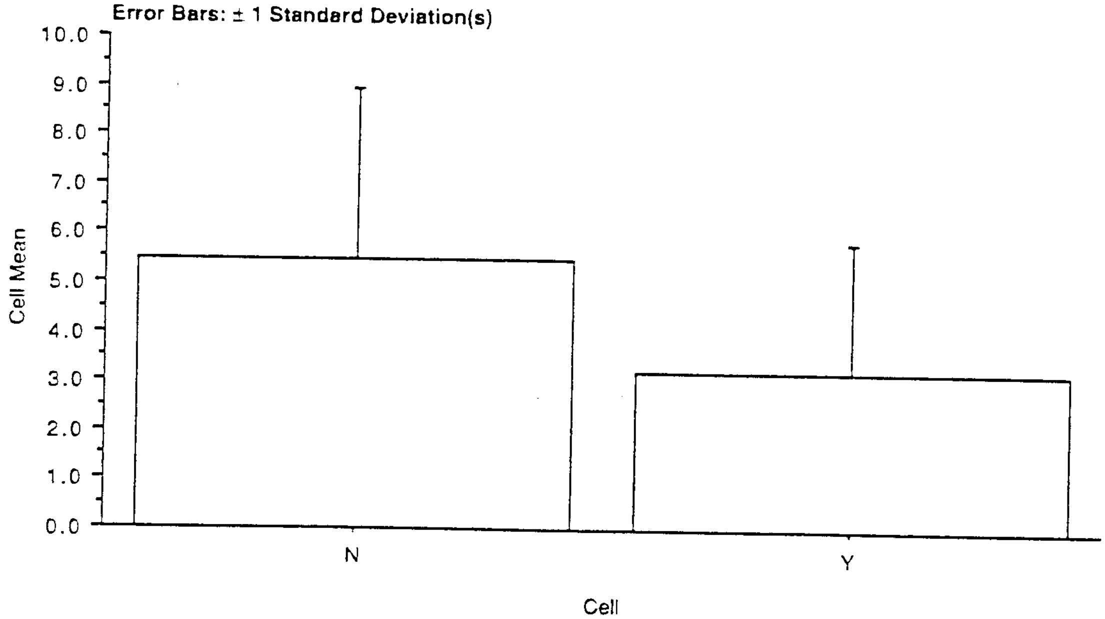
ANOVA Table for LOS

	DF	Sum of Squares	Mean Square	F-Value	P-Value
PAU	1	342.356	342.356	41.265	<0.0001
DRG	5	1141.697	228.339	27.522	<0.0001
PAU * DRG	5	113.021	22.604	2.725	0.0193
Residual	506	4198.018	8.296		

Means Table for LOS
Effect: PAU

	Count	Mean	Std. Dev.	Std. Err.
N	367	5.447	3.508	0.183
Y	151	3.192	2.637	0.215

Interaction Bar Plot for LOS
Effect: PAU
Error Bars: ± 1 Standard Deviation(s)



Means Table for LOS
Effect: DRG

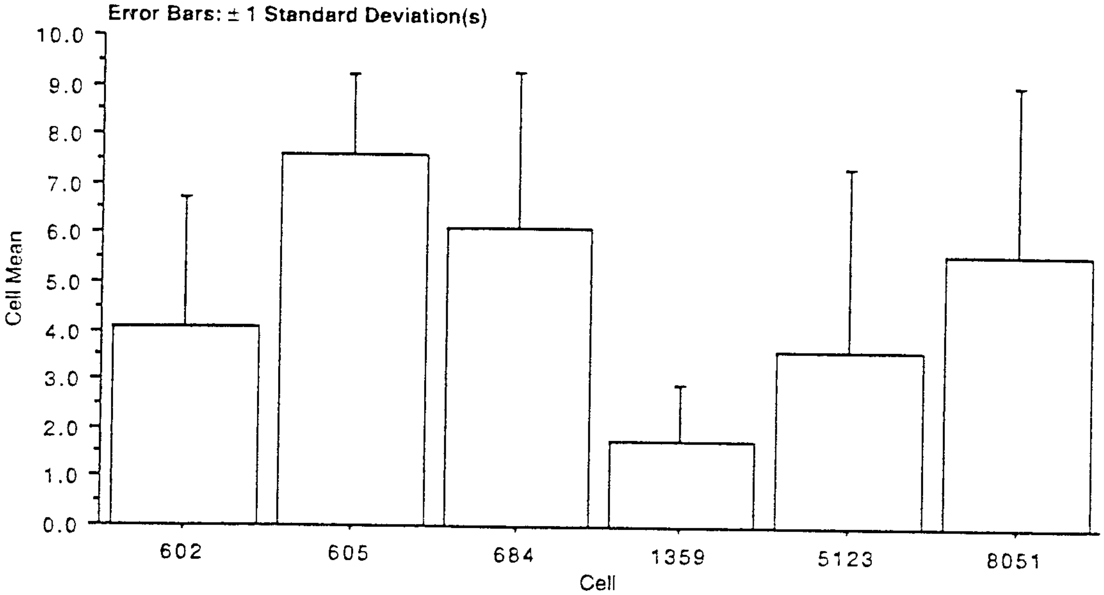
	Count	Mean	Std. Dev.	Std. Err.
602	72	4.097	2.623	0.309
605	33	7.606	1.619	0.282
684	127	6.102	3.179	0.282
1359	64	1.766	1.151	0.144
5123	98	3.592	3.771	0.381
8051	124	5.605	3.445	0.309

EFFECTS OF PAU AND DRG (SEPARATE AND COMBINED) ON LOS

Means Table for LOS
Effect: PAU * DRG

	Count	Mean	Std. Dev.	Std. Err.
N, 602	49	4.857	2.821	0.403
N, 605	21	7.905	1.446	0.316
N, 684	90	6.456	3.076	0.324
N, 1359	41	2.049	1.303	0.203
N, 5123	66	4.621	4.202	0.517
N, 8051	100	6.250	3.488	0.349
Y, 602	23	2.478	0.898	0.187
Y, 605	12	7.083	1.832	0.529
Y, 684	37	5.243	3.303	0.543
Y, 1359	23	1.261	0.541	0.113
Y, 5123	32	1.469	0.761	0.135
Y, 8051	24	2.917	1.316	0.269

Interaction Bar Plot for LOS
Effect: DRG
Error Bars: ± 1 Standard Deviation(s)



602 = Transurethral Prostatectomy
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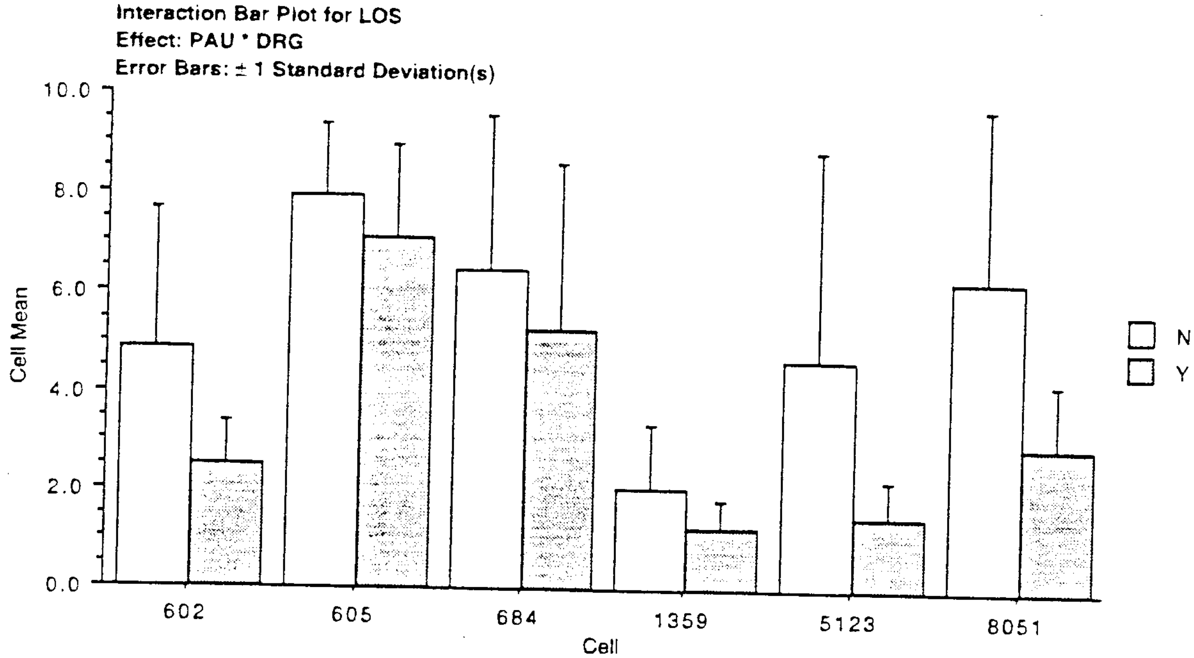
EFFECTS OF PAU AND DRG (SEPARATE AND COMBINED) ON LOS



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605 = Radical Prostatectomy
684 = Total Abdominal Hysterectomy
1359 = Lens Extraction
5123 = Laparoscopic Cholecystectomy
8051 = Diskectomy

APPENDIX D

LOS of Study Groups Split by DRG

ANALYSIS OF STUDY GROUPS EFFECTS ON LOS

ANOVA Table for LOS

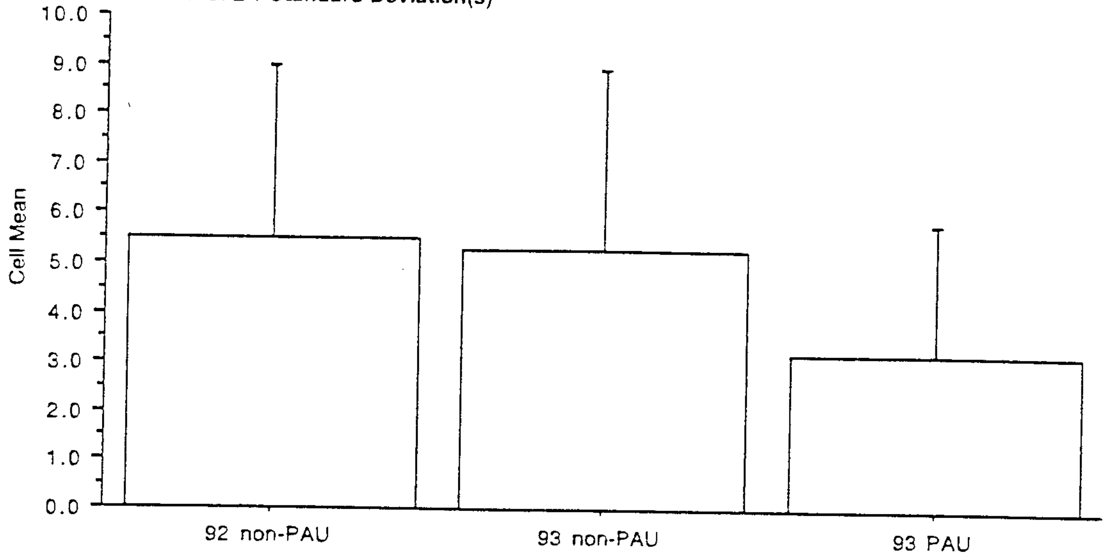
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	546.941	273.471	25.398	<0.0001
Residual	515	5545.123	10.767		

Model II estimate of between component variance: 1.736

Means Table for LOS
Effect: Study Groups

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	287	5.495	3.470	0.205
93 non-PAU	80	5.275	3.659	0.409
93 PAU	151	3.192	2.637	0.215

Interaction Bar Plot for LOS
Effect: Study Groups
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for LOS
Effect: Study Groups
Significance Level: 5 %

	Mean Diff.	Crit. Diff	P-Value	
92 non-PAU, 93 non-PAU	0.220	0.815	0.5965	
92 non-PAU, 93 PAU	2.303	0.648	<0.0001	S
93 non-PAU, 93 PAU	2.083	0.891	<0.0001	S

APPENDIX D-1

ANOVA Table for LOS
Split By: DRG
Cell: 602

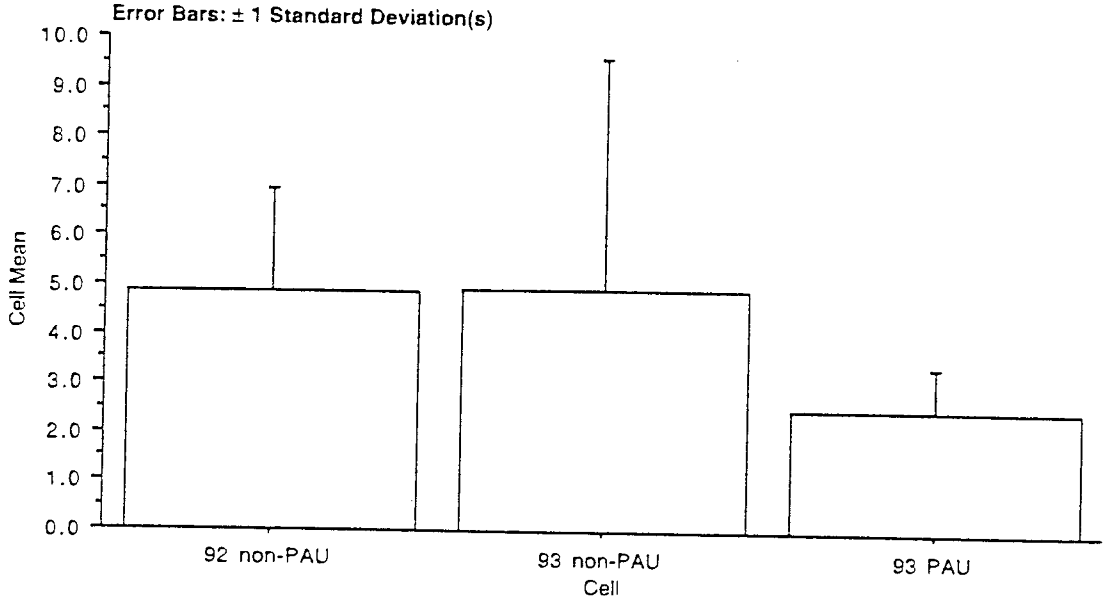
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	88.619	44.309	7.649	0.0010
Residual	69	399.701	5.793		

Model II estimate of between component variance: 1.795

Means Table for LOS
Effect: Study Groups
Split By: DRG
Cell: 602

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	38	4.842	2.099	0.341
93 non-PAU	11	4.909	4.679	1.411
93 PAU	23	2.478	0.898	0.187

Interaction Bar Plot for LOS
Effect: Study Groups
Split By: DRG
Cell: 602
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for LOS
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 602

	Mean Diff.	Crit. Diff	P-Value	
92 non-PAU, 93 non-PAU	-0.067	1.644	0.9354	
92 non-PAU, 93 PAU	2.364	1.268	0.0004	S
93 non-PAU, 93 PAU	2.431	1.760	0.0075	S

ANOVA Table for LOS
Split By: DRG
Cell: 605

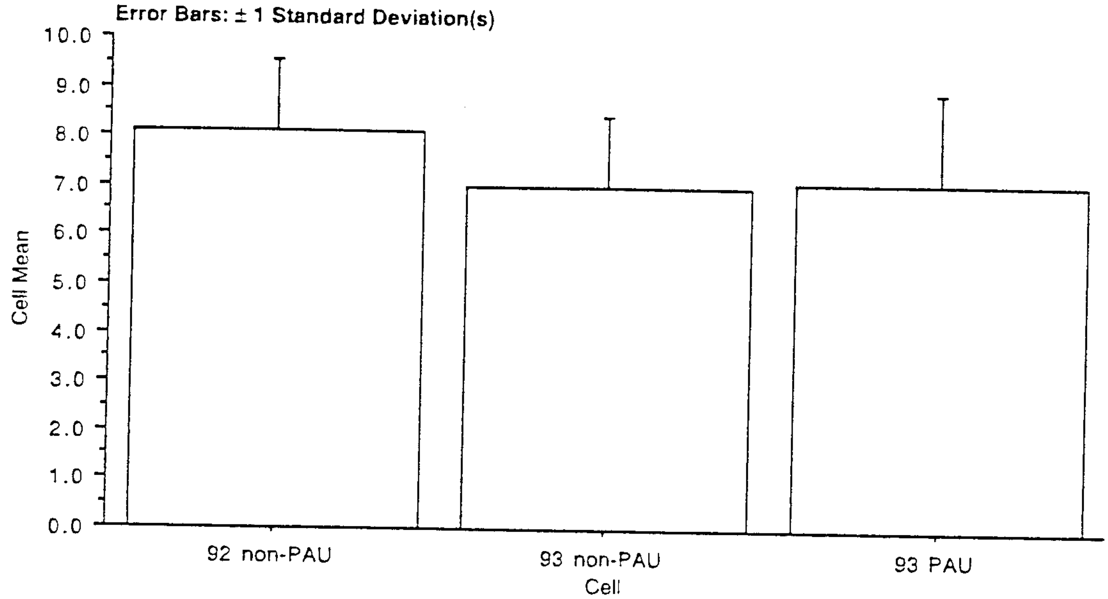
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	9.197	4.599	1.847	0.1751
Residual	30	74.681	2.489		

Model II estimate of between component variance: 0.218

Means Table for LOS
Effect: Study Groups
Split By: DRG
Cell: 605

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	17	8.118	1.409	0.342
93 non-PAU	4	7.000	1.414	0.707
93 PAU	12	7.083	1.832	0.529

Interaction Bar Plot for LOS
Effect: Study Groups
Split By: DRG
Cell: 605
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for LOS
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 605

	Mean Diff.	Crit. Diff	P-Value
92 non-PAU, 93 non-PAU	1.118	1.791	0.2122
92 non-PAU, 93 PAU	1.034	1.215	0.0923
93 non-PAU, 93 PAU	-0.083	1.860	0.9277

ANOVA Table for LOS
Split By: DRG
Cell: 684

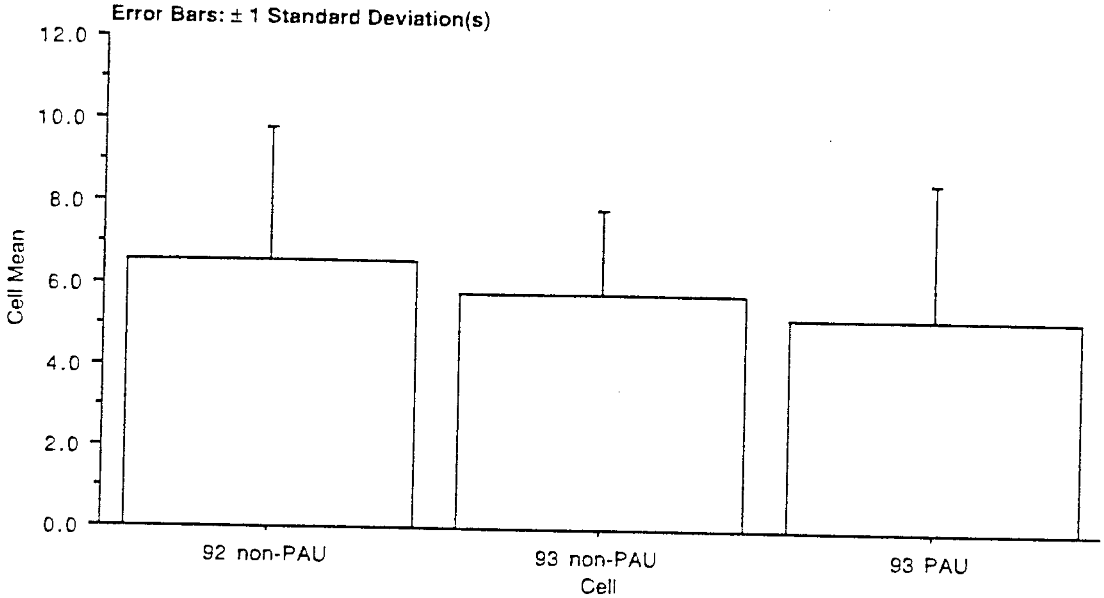
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	45.975	22.988	2.322	0.1023
Residual	124	1227.694	9.901		

Model II estimate of between component variance: 0.378

Means Table for LOS
Effect: Study Groups
Split By: DRG
Cell: 684

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	76	6.579	3.226	0.370
93 non-PAU	14	5.786	2.045	0.547
93 PAU	37	5.243	3.303	0.543

Interaction Bar Plot for LOS
Effect: Study Groups
Split By: DRG
Cell: 684
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for LOS
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 684

	Mean Diff.	Crit. Diff	P-Value	
92 non-PAU, 93 non-PAU	0.793	1.811	0.3877	
92 non-PAU, 93 PAU	1.336	1.248	0.0362	S
93 non-PAU, 93 PAU	0.542	1.954	0.5837	

ANOVA Table for LOS
Split By: DRG
Cell: 1359

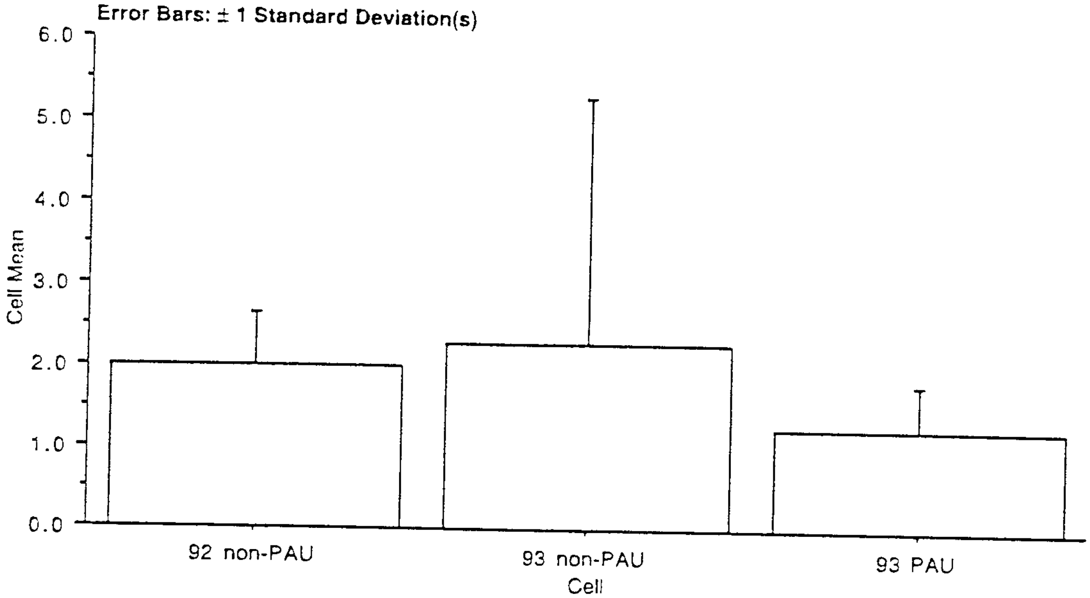
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	9.621	4.811	3.973	0.0239
Residual	61	73.863	1.211		

Model II estimate of between component variance: 0.195

Means Table for LOS
Effect: Study Groups
Split By: DRG
Cell: 1359

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	34	2.000	0.651	0.112
93 non-PAU	7	2.286	2.984	1.128
93 PAU	23	1.261	0.541	0.113

Interaction Bar Plot for LOS
Effect: Study Groups
Split By: DRG
Cell: 1359
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for LOS
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 1359

	Mean Diff.	Crit. Diff	P-Value	
92 non-PAU, 93 non-PAU	-0.286	0.913	0.5339	
92 non-PAU, 93 PAU	0.739	0.594	0.0156	S
93 non-PAU, 93 PAU	1.025	0.950	0.0349	S

ANOVA Table for LOS
Split By: DRG
Cell: 5123

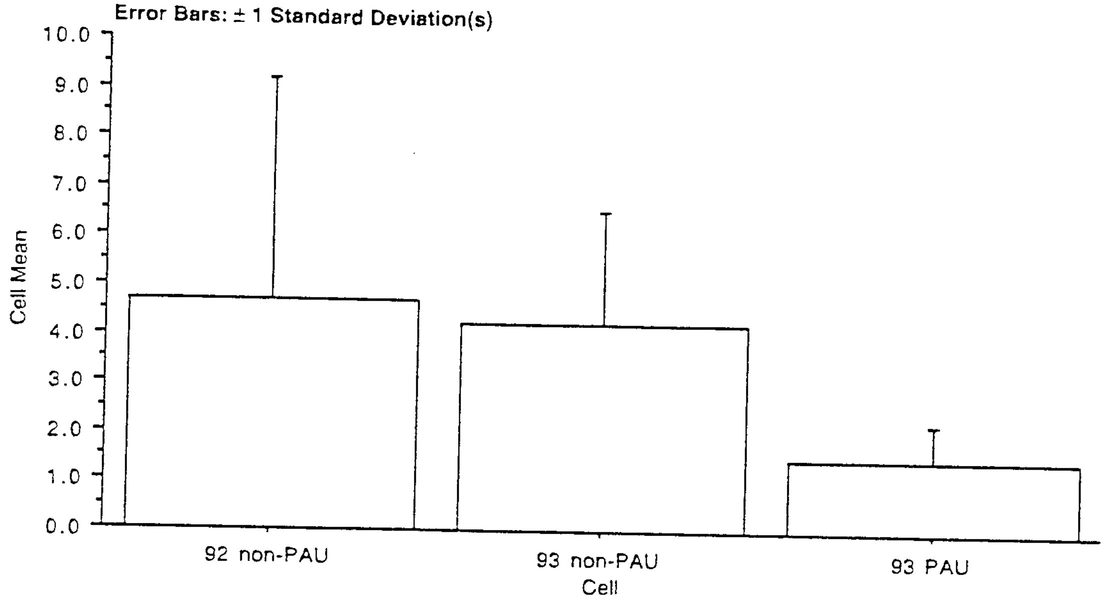
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	216.265	108.133	8.830	0.0003
Residual	95	1163.408	12.246		

Model II estimate of between component variance: 3.517

Means Table for LOS
Effect: Study Groups
Split By: DRG
Cell: 5123

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	56	4.696	4.464	0.596
93 non-PAU	10	4.200	2.348	0.742
93 PAU	32	1.469	0.761	0.135

Interaction Bar Plot for LOS
Effect: Study Groups
Split By: DRG
Cell: 5123
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for LOS
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 5123

	Mean Diff.	Crit. Diff	P-Value	
92 non-PAU, 93 non-PAU	0.496	2.385	0.6804	
92 non-PAU, 93 PAU	3.228	1.540	<0.0001	S
93 non-PAU, 93 PAU	2.731	2.517	0.0337	S

ANOVA Table for LOS
Split By: DRG
Cell: 8051

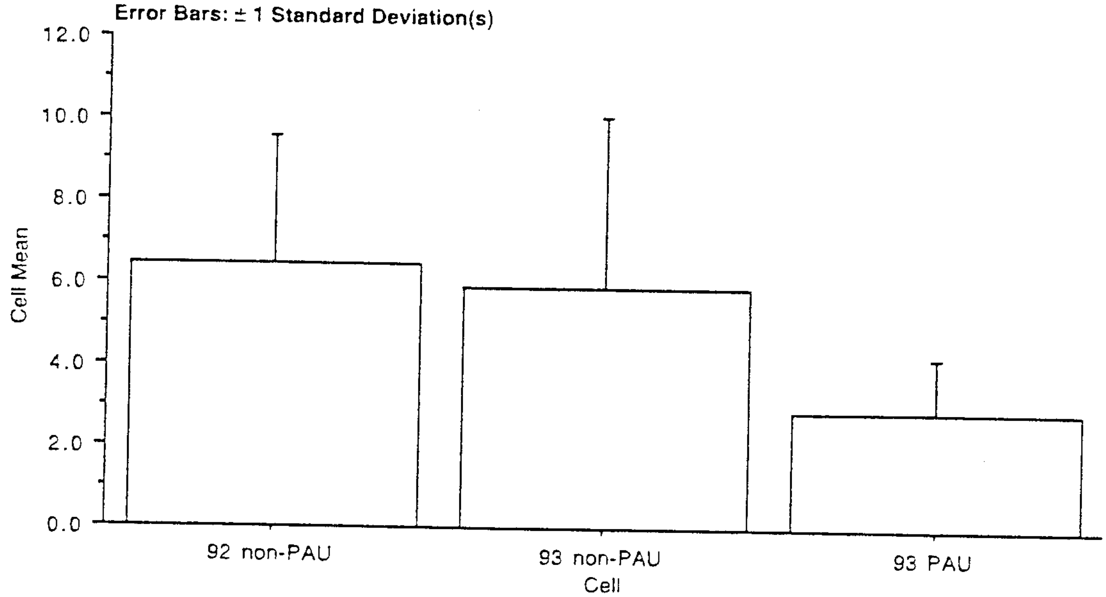
	DF	Sum of Squares	Mean Square	F-Value	P-Value
Study Groups	2	220.947	110.474	10.791	<0.0001
Residual	121	1238.690	10.237		

Model II estimate of between component variance: 2.676

Means Table for LOS
Effect: Study Groups
Split By: DRG
Cell: 8051

	Count	Mean	Std. Dev.	Std. Err.
92 non-PAU	66	6.424	3.109	0.383
93 non-PAU	34	5.912	4.159	0.713
93 PAU	24	2.917	1.316	0.269

Interaction Bar Plot for LOS
Effect: Study Groups
Split By: DRG
Cell: 8051
Error Bars: ± 1 Standard Deviation(s)



Fisher's PLSD for LOS
Effect: Study Groups
Significance Level: 5 %
Split By: DRG
Cell: 8051

	Mean Diff.	Crit. Diff	P-Value	
92 non-PAU, 93 non-PAU	0.512	1.337	0.4495	
92 non-PAU, 93 PAU	3.508	1.510	<0.0001	S
93 non-PAU, 93 PAU	2.995	1.689	0.0006	S